CONSTRUCTION BID DOCUMENTS

NARRATIVE

Improve Emergency Cache

Project No. 595-11-127

Lebanon VA Medical Center
Lebanon, PA

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Building One – 1st Floor
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Miller-Remick LLC
M.E.P. & Structural Engineering
A Service Disabled Veteran Owned Small Business

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CHAPTER 1

GENERAL

1. APPLICABLE LOCAL CODES

   .1 State of Pennsylvania Uniform Construction Code

   .2 International Code Series 2009 Edition Including

   - International Building Code (IBC)
   - International Fire Code (IFC)
   - International Fuel Gas Code (IFGC)
   - International Mechanical Code (IMC)
   - International Plumbing Code (IPC)

   .3 International Existing Building Code 2009 Edition or Chapter 34 of IBC as selected by Design Professional

   .4 International Fire Code 2009 Edition (as referenced by IBC-2009)

   .5 NFPA 99 - Healthcare Facilities

   .6 NFPA 101 - Life Safety Code, 2009 Edition

   .7 NFPA 13 - Standard for the Installation of Sprinkler Systems

   .8 NFPA 72 - National Fire Alarm and Signaling Code

2. APPLICABLE NATIONAL STANDARDS

   .1 Barrier Free Design Guides that exceeds minimums of the Architectural Barriers Act (ABA) and the Americans with Disabilities Act (ADA) for healthcare projects.

3. APPLICABLE OWNER GUIDELINES

   .1 Architectural Design Manual, August 2011 Edition

   .2 A/E Submission Instructions for Minor and NRM Construction Program

ARCHITECTURAL DESIGN

1. STERILE STORAGE (ROOM SRS02)

.1 Renovate existing Kitchen and auxiliary spaces to create Sterile Storage Room and Clean Supply Storage Room in Building 19. The Sterile Storage Room will house medical supplies and pandemic supplies. The room is accessed through a new double door. The Sterile Storage Room also has direct access to the adjacent Clean Storage Room.

.2 Areas:

- Sterile Storage: 888 sf
- Total Net Area: 888 sf

.3 Scope of Work (all rooms unless noted otherwise)

- New Epoxy Resin Floor (remove existing flooring and adhesives, shot blast concrete floor, install new 3/16 inch thick resinous floor similar to VA standard RES-3 with additional epoxy topcoat in orange peel finish for mopable surface). Repair and restore concrete subfloor after demolition of existing flooring and prior to the installation of new flooring.
- New Acoustical Ceiling Panels in suspended grid system (Armstrong - Health Zone Ultima). Ceiling height: 8'-4"
- Existing Glazed Tile walls to be furred out with 2-1/2" metal studs to accept new Gypsum Board. Gypsum Board walls to receive epoxy paint finish.
- Wall protection on all exposed surfaces. Heavy duty protection where likely to be impacted by forklift or carts.
- Corner protection on all exposed corners.
- New Fire Rated Doors.
- 3'-0" gypsum board window pocket at each existing windows with 11'-0" head height.
- New Fire Rated Window
- New plastic laminate work station.

.4 Details

- Enlarge existing door opening to corridor to accommodate new double door.
- Existing walls to be extended to underside of deck in order to achieve one hour rating.
- Remove the three existing walk-in freezers in their entirety.
- Remove existing cove tile base to allow for installation of furring strips or metal studs on all existing glazed tile walls.
- Existing exterior windows to remain.

2. CLEAN SUPPLY STORAGE (ROOM SRS01)

.1 Renovate existing Kitchen and auxiliary spaces to create Sterile Storage Room and Clean Supply Storage Room in Building 19. The Clean Supply Storage Room will house medical supplies and pandemic supplies. The room is accessed through a new double door. The Sterile Storage Room also has direct access to the adjacent Clean Storage Room.

.2 Areas:

- Clean Supply Storage: 1078 sf
- Total Net Area: 1078 sf

.3 Scope of Work (all rooms unless noted otherwise)

- New Epoxy Resin Floor (remove existing flooring and adhesives, shot blast concrete floor, install new 3/16 inch thick resinous floor similar to VA standard RES-3 with additional epoxy topcoat in orange peel finish for mopable surface). Repair and restore concrete subfloor after demolition of existing flooring and prior to the installation of new flooring.
- New Acoustical Ceiling Panels in suspended grid system (Armstrong - Health Zone Ultima). Ceiling height: 8'-4"
- Existing Glazed Tile walls to be furred out to accept new Gypsum Board. Gypsum Board walls to receive epoxy paint finish.
- Wall protection on all exposed surfaces. Heavy duty protection where likely to be impacted by forklift or carts.
- Corner protection on all exposed corners.
- New Fire Rated Doors.

- New Fire Rated Window
- New plastic laminate work station and casework.
- 3'-0" gypsum board window pocket at each existing windows with 11'-0" head height.
- Existing Glazed Tile walls to be furred out with 2-1/2" metal studs to accept new Gypsum Board. Gypsum Board walls to receive epoxy paint finish.

.4 Details

- Remove existing corridor door and infill wall. Match existing glazed tile finish on corridor side of new wall.
- Remove portion of existing corridor wall to accommodate new double fire rated door.
- Existing walls to be extended to underside of deck in order to achieve one hour rating.
- Remove existing cove tile base to allow for installation of furring strips or metal studs on all existing glazed tile walls.
- Existing exterior windows to remain.
- Construct new demising wall between Clean Supply Storage and existing Elevator Machine Room.
- Construct new rated demising wall between Clean Supply Storage and Sterile Storage Room. New fire rated double door.

3. EXISTING ELEVATOR MACHINE ROOM, MECHANICAL ROOM AND EXISTING TOILET ROOM

.1 Provide code compliant egress from existing elevator machine room and mechanical room through the existing toilet room and to the corridor in Building 19. Demolish plumbing fixtures and walls in existing toilet room. Enlarge existing toilet room door opening to accommodate egress door. Provide mechanical cooling in the existing Elevator Machine Room and Mechanical Room. The installation of new mechanical equipment/ductwork will require the demolition of the existing ceiling. New ceiling will be installed.

.2 Areas:

- Mechanical Room: 244 sf

- Elevator Machine Rm: 110 sf
- Total Net Area: 354 sf

.3 Scope of Work (all rooms unless noted otherwise)

- Demolish plumbing fixtures and portions of the existing walls in existing toilet room.
- Remove portion of existing wall in Mechanical Room to accommodate new opening to former toilet room.
- Enlarge existing door opening in former toilet room to accommodate egress door.
- Remove existing gypsum board ceilings in Elevator Machine Room and adjacent Mechanical Room to allow for installation of cooling equipment/system.

.4 Details

- Install egress door for enlarged Mechanical Room.
- Install new Acoustic Panel Ceilings (Armstrong Fissured 755).

4. EXISTING VENDING ROOM

.1 Provide mechanical cooling in the existing Vending Room in Building 19. The installation of new mechanical equipment/ductwork will require the demolition of the existing ceiling. New acoustic ceiling will be installed.

.2 Areas:

- Existing Vending: 114 sf
- Total Net Area: 114 sf

.3 Scope of Work (all rooms unless noted otherwise)

- Remove existing ceiling system.
- Install new Acoustic Panel Ceilings (Armstrong Fissured 755).

5. BULK STORAGE AREA (ROOM SRS03)

.1 Renovate and subdivide existing Storage Room in Building 22. Housekeeping Storage will house general janitorial supplies and equipment. The room is accessed through a new double door.

.2 Areas:

- Bulk Storage Area: 2349 sf
- Total Net Area: 2349 sf

.3 Scope of Work (all rooms unless noted otherwise)

- New VCT Floor with rubber base (Construct new floor system to match the floor height of the existing corridor floor). Repair and restore concrete subfloor after demolition of existing flooring and prior to the installation of new flooring.
- New Acoustical Ceiling Panels in suspended grid system. Ceiling height: 8'-4"
- Gypsum Board walls to receive paint finish.
- Wall protection on all exposed surfaces. Heavy duty protection where likely to be impacted by forklift or carts.
- Corner protection on all exposed corners.
- New Fire Rated Doors.

.4 Details

- Remove existing corridor door and expand opening to allow for new double door.
- Remove existing corridor door and infill with gypsum board partition. Corridor side of wall to match existing adjacent finishes.
- Existing walls to be extended to underside of deck in order to achieve one hour rating.
- Existing exterior windows to remain.
- Construct new rated demising wall between Housekeeping Storage and Office Suite.
- Construct new floor structure to align with existing corridor floor.

6. OFFICE SUITE (ROOMS OFA01, OFA02, OFA03, OFA04, OFA05, OFA06, OFA07, OFA08)

.1 Renovate and subdivide existing Storage Room in Building 22 to house an office suite with seven individual offices and cubicles.

.2 Areas:

- Open Office Area: 1239 sf
- Office: 143 sf
- Office: 134 sf
- Office: 125 sf
- Office: 129 sf
- Office: 111 sf
- Office: 109 sf
- Office: 130 sf
- Total Net Area: 2120 sf

.3 Scope of Work (all rooms unless noted otherwise)

- New Carpet with rubber base (Construct new floor system to match the floor height of the existing corridor. Prepare new flooring system for installation of new carpeting).
- New Acoustical Ceiling Panels in suspended grid system. Ceiling height: 8'-4". (Armstrong Ultima).
- Walls to be gypsum board with painted finish. Sound attenuation batt insulation in wall cavity to achieve STC 40 rating.
- Furr out all existing walls with 7/8” metal hat channel and 5/8” gypsum board.
- Corner protection on all exposed corners.
- New fire rated demising wall between Office Suite and Housekeeping Storage

.4 Details

- Remove portions of the existing walls to accommodate new door openings.
- Remove existing corridor doors and infill with gypsum board partition. Corridor side of wall to match existing adjacent finishes.
- Existing exterior windows to remain.
- Construct new rated demising wall between Housekeeping Storage and Office Suite.
- Construct new partition walls for the individual offices.
- Construct new floor structure to align with existing corridor floor.
- Fur out all existing walls with 7/8” metal hat channel and 5/8” gypsum board.

CHAPTER 2

MECHANICAL

1. GENERAL

.1 Building 19

- This project will provide the renovation and expansion of the Emergency Cache storage areas at the VA Medical Center in Lebanon, PA. The mechanical design will bring new and existing spaces up to current VA design criteria.
- The project will provide the design for the upgrade of existing storage areas totaling approximately 2,230 square feet to separate clean and sterile storage areas. The project will also include the cooling of existing adjacent spaces (elevator machine room, mechanical room and vending room) totaling approximately 530 square feet.

.2 Building 22

- This project will provide the renovation and expansion of the EMS storage areas and provide a new office area at the VA Medical Center in Lebanon, PA. The mechanical design will bring the new and existing spaces up to current VA design criteria.
- The project will provide the design for the upgrade of existing storage areas and a new office area totaling approximately 4,700 square feet.

2. SCOPE

.1 The renovation and expansion of storage areas include the following locations and scope:

- Building 19 – *Emergency Cache Clean and Sterile Storage Rooms* – The existing air handling unit, AC-3-19, currently serving the space will be modified and dedicated to serve the new clean and sterile storage rooms only. Both rooms will be designed to meet current VA design requirements for *Satellite SPD Storage*.

- Building 19 – *Vending and Mechanical Rooms* - Provide each room with a (1-1/2) ton, 2-pipe, cooling only chilled water fan coil unit mounted in the ceiling. Fan coil unit to have ducted supply and return. Provide return air filter grille. Individual outside air ductwork will not be provided to each fan coil unit. Cooling coil condensate piping to tie into existing cooling coil condensate drain line located above adjacent corridor ceiling. Controls will tie into the existing Delta control system.

- Building 19 - *Elevator Machine Room* – Provide a wall mounted (2) ton split system heat pump with inverter technology to serve the room. The condensing unit to be mounted outside, on the exterior wall, 2'0" above grade. Demolish existing fan and associated filter rack. Demolish existing baseboard connector. Blank off louvers and provide wall mount heat pump in location vacated by demolished fan. Cooling coil condensate piping to run through exterior wall and spill to grade. Unit to be on emergency power.

- Building 19 – *Tele/Data Room* – Per Lebanon VA, room will be cooled under separate contract.

- Building 22 – *EMS Storage*: Provide a new variable volume, return air AHU to serve both the new EMS storage area and the new office suite. The storage area will be designed to meet current VA design requirements for *Non-Sterile Storage*, except, per VA facilities, unit will *not* be designed for 100% OA.

- Building 22 – *Office Suite*: Provide a new variable volume, return air AHU to serve both the new EMS storage and the new office suite. The office suite will be designed to meet current VA design requirements.

3. EXISTING CONDITIONS

.1 Building 19

- EMS Storage - The former kitchen area is cooled and heated by a single zone, variable volume, air handling unit (AC-3-19) mounted on roof dunnage directly above the project area. The cooling medium is chilled water and the heating medium is steam. A general building exhaust fan (located outside the project boundary) exhausts the toilet room, janitor's closet and (2) small storage rooms that exit directly into the EMS storage area (within the former kitchen boundary). Per VA facilities, the supply and return fan VFD's for AC-3-19 are set to run as constant volume.

- Elevator Machine Room – Elevator equipment is cooled by bringing outside air, through an intake louver and filter, directly into the room and exhausting it through a wall-mounted fan and louver. Heating is provided by a wall mounted convector.

- Elevator Machine Room Office/Storage Area – Room adjacent to elevator machine room and EMS storage area is cooled and heated from AC-3-19.

- Vending Area - Room adjacent to EMS storage area is cooled and heated from AC-3-19.

- Tele/Data Room – Room adjacent to EMS storage area brings transfer air under the door from adjacent Vending Room and exhausts through a general building exhaust fan located outside the project boundary.

.2 Building 22

- Storage areas for EMS, Electrical, and Emergency Cache are heated and cooled through (6) ceiling mounted, 4-pipe fan coil units. The cooling medium is chilled water and the heating medium is low pressure steam piped to each unit. Cooling coil condensate is manifolded together and piped to the exterior at a height above the windows. Outside air is ducted to (3) of the fan coils from an existing energy recovery unit located on the third floor roof.

4. DESIGN APPROACH

.1 Each area was analyzed for design approach requirements in the DVA, 'HVAC Design Manual for New, Replacement, Addition, and Renovation of Existing VA Facilities,' for *Supply, Processing, and Distribution* (SPD) areas. The following preliminary design approach will be utilized for each type of storage space:

.2 **Building 19** - Sterile Storage and Clean Storage Areas

- Indoor design conditions: 72-78 degree F design temperature for heating and cooling seasons.

- Humidity: In order to maintain the spaces within a range of 20% to 60% relative humidity during all seasons, an electrode steam humidifier will be provided for each room.

- Minimum of ten air changes per hour (10 ACH).

- Modify existing AC-3-19 for variable volume control.

- An offset between supply and return air quantities will maintain positive air pressurization within each space.

- New supply and return ductwork will be run from existing AC-3-19 to each room.

- Each room will be designed with a VAV control box and electric reheat coil with SCR technology for individual temperature control.

- A wall mounted steam-to-clean steam generator (type Nortec; model SSG) will be provided for each VAV box. Steam and condensate branch piping to the generators will be from basement floor below. Steam distribution

piping will be routed from each generator to a duct-mounted steam humidifier (type Nortec; model SAM-E; short absorption manifold) installed downstream of each VAV box. Ductwork 3'0" downstream of humidifier to be stainless steel.

- Each room to be provided with (2) one and a half ton split system heat pumps with inverter technology on emergency power for conditions when chiller plant is down. (1) Air cooled condensing unit will serve both heat pumps per room. Cooling coil condensate piping to run through exterior wall and spill to grade. Condensing units to be mounted outside, on the exterior wall, 2'0" above grade.

- New DDC controls to tie into existing building/site Delta control system.

- Refer to Appendix for sketches and load calculations.

.3 **Building 22 –** Non-Sterile Storage

- A new variable volume, return air, AHU will be designed to serve both the new EMS storage and new office suite within Building 22. The unit will be located on dunnage, 3'0" of the ground (per Lebanon VA site standards) at the exterior of the building adjacent to the project area. Ductwork will run outside and exposed before entering the project area overhead and above the ceiling.

- Per VA, outside air ductwork is not requested to extend up the side of the building to 30'0" off of the ground.

- Chilled water, steam and condensate will be delivered to the new unit via the basement crawl space.

- The new spaces will not be designed for humidity control. Space will be left in the AHU for a future humidifier.

- Each enclosed office to have a dedicated VAV control box with a hot water reheat coil for individual temperature control. Remaining open office space to be controlled through a single VAV control box with hot water reheat coil.

- The new storage area will be served by two variable air volume (VAV) control boxes with hot water reheat coils for temperature control.

- A new dual pump skid with steam-to-hot water heat exchanger will be located in the basement of Building 22 and will take medium pressure steam from the site loop and deliver heating hot water to the new first floor reheat coils.

- New DDC controls to tie into existing building/site Delta control system.
- AHU shall be designed to provide design CFM with the fan VFD's set to 80%.
- Refer to Appendix for sketches, load calculations, and AHU cut sheet.

4. Per VA, seismic restraints are not required.

5. HEATING PLANT

.1 The existing Lebanon VA Medical Center utilizes high, medium, and low pressure steam as a medium to supply heat to the various systems throughout the campus. Steam piping is run to each building through a series of tunnels and crawl spaces, and will be tapped for the new systems being provided as part of this renovation project. Refer to the sketches for additional details.

6. COOLING PLANT

.1 The existing Lebanon VA Medical Center utilizes chilled water as a medium to supply cooling to the various systems throughout the building. Chilled water piping is run to each building through a series of tunnels and crawl spaces, and will be tapped for the new systems being provided as part of this renovation project. Refer to the sketches for additional details.

CHAPTER 3

ELECTRICAL

1. GENERAL

.1 Building 19

- This project will provide the renovation and expansion of the Emergency Cache storage areas at the VA Medical Center in Lebanon, PA. The electrical design will bring new and existing spaces up to current VA design criteria.
- The project will provide the design for the upgrade of existing storage areas totaling approximately 2,230 square feet to separate clean and sterile storage areas. The project will also include the cooling of existing adjacent spaces (elevator machine room, mechanical room and vending room) totaling approximately 530 square feet.

.2 Building 22

- This project will provide the renovation and expansion of the EMS storage areas and provide a new office area at the VA Medical Center in Lebanon, PA. The electrical design will bring the new and existing spaces up to current VA design criteria.
- The project will provide the design for the upgrade of existing storage areas and a new office area totaling approximately 4,700 square feet.

2. SCOPE

.1 The renovation and expansion of storage areas include the following scope:

- Lighting: Building 19 shall be provided with new, fluorescent, recessed, and sealed fixtures. The fixtures will be designed to separate internal lighting components from the surrounding environment to prevent contamination of the environment with dirt, dust, and moisture. Lighting levels will be in accordance with VA Design Standards of 30 foot candles for clean and sterile supplies. Light switching shall be controlled with switching at the main doors and shall override ceiling mounted occupancy sensors. Building 22 shall follow the VA design guide for office fixtures and switching.

- Card Readers: Proximity card readers shall be provided for secure areas. The card readers shall be GE models per the VA request to match existing card readers at the facility.

- Convenience Receptacles: Convenience receptacles shall be provided every 13 feet in the clean supply and sterile storage areas of Building 19. Building 22 shall follow the VA design guide placement of receptacles for offices.

- Mechanical Systems: For Buildings 19 and 22, all new mechanical systems will be provided with new branch circuits and local disconnect switches as required in accordance with VA Electrical Design Standards.

- H.V.A.C.: Building 19 has an existing air handling unit, AC-3-19. It shall be upgraded to have (variable frequency drives) VFD's on its supply and return fans. Building 22 shall have a new air handling unit that shall come with VFD's.

- Phone and Data: For Building 19, phone and data outlets shall be provided at the doors and shall be provided every 13 feet in the clean supply and sterile storage areas next to receptacles. Building 22 shall follow the VA electrical design guide for offices. For both buildings, all data and phone outlets shall be tied into each building's existing system.

- Fire Alarm: For Building 19, strobes and voice mass notification speakers shall be placed in the storage areas, mechanical room, elevator machine room and vending room. Heat and smoke detection shall be provided in the elevator machine room. Smoke detection shall be provided in the machine room for the elevator landing smoke detector requirements. All new devices shall be tied into the building's existing fire alarm system. Building 22 shall be provided with speaker/strobes in the general office area and in the storage areas. All new devices shall be tied into the building's existing fire alarm system.

- Emergency power: the following equipment in the Building 19 renovation area shall be placed on emergency power. This includes:

  - Convenience receptacles

  - Lighting

  - The existing AHU currently serving the space.

  - The new split system DX units for the clean and sterile storage areas.

  - The new split system DX unit for the existing elevator machine room.

CHAPTER 4

PLUMBING

1. GENERAL

.1 The plumbing systems will be in accordance with the DVA Plumbing Design Manual; Revised April 2010

.2 The plumbing codes and standards planned to be utilized are the latest editions of the following;

- International Building Code (IBC)
- International Fire Code (IFC)
- International Fuel Gas Code (IFGC)
- International Mechanical Code (IMC)
- International Plumbing Code (IPC)

2. EXISTING CONDITIONS

.1 Building 19

- The project boundary encompasses first floor areas and rooms in Building 19, formally used as a kitchen, and currently used as EMS storage. Much of the kitchen equipment has been removed; however various associated piping has been abandoned-in-place within the ceiling cavity.
- Sanitary piping to existing floor drains runs on the basement level in crawl spaces located below the floor.

.2 Building 22

- There is currently no plumbing piping/equipment located within the project boundary of Building 22.

3. SCHEMATIC DESIGN APPROACH

.1 Building 19

- The project scope in Building 19 consists of demolition work only. There is no new plumbing work in Building 19.

- Demolition consists of removing an existing toilet, three sinks, multiple floor drains and all associated piping back to existing mains and capped air water/tight. Piping to be insulated to match existing.

.2 Building 22

- There is no plumbing scope (either demolition or new work) in Building 22.

CHAPTER 5

FIRE PROTECTION

1. GENERAL

.1 The fire alarm and fire protection systems will be in accordance with the DVA Fire Protection Design Manual; Sixth Edition; Revised September 2011.

.2 The fire protection codes and standards planned to be utilized are the latest editions of the National Fire Codes (NFC) as published by the National Fire Protection Association (NFPA). Where fire alarm or fire protection features are not addressed by the NFC, the International Building Code (IBC) or other referenced standard shall be used. For the renovations, the following NFC standards for the base code references.

- NFPA 101 – Life Safety Code
- NFPA 13 – Standard for the Installation of Sprinkler Systems
- NFPA 72 – National Fire Alarm and Signaling Code

Should the codes from the International Code Council (ICC), need to be consulted, the following form the base code references.

- International Building Code (IBC)
- International Fire Code (IFC)
- International Fuel Gas Code (IFGC)
- International Mechanical Code (IMC)
- International Plumbing Code (IPC)

2. EXISTING CONDITIONS

.1 The design of the Improve Emergency Cache renovation will integrate into the systems and services of the existing VA Medical Center campus.

- Fire Alarm System – Existing initiation devices and notification devices are connected to the FACP either directly or through Fire Alarm Terminal Cabinets (FATC). The existing fire alarm system is addressable, and any new devices will be compatible with the addressable system.

- Fire Protection System – Building 19 and Building 22 are fully sprinklered. The existing heads and piping will be modified as necessary to support the future project areas. Existing sprinkler piping within the Building 19 project boundary area has been identified as CPVC piping. Lebanon VA Facilities has indicated other similar installations on campus with CPVC piping were able to be modified without being replaced. Renovated areas are to be utilized as storage and thus classified as ordinary hazard per NFPA. CPVC piping is only rated for light hazard areas therefore it should be replaced with acceptable rated (steel) pipe.

3. SCHEMATIC DESIGN APPROACH

.1 Building 19

- The fire alarm system for the renovation will connect to, and extend from, the existing building fire alarm system.

- The fire protection system for the renovation will connect to, and extend from, the existing building wet pipe sprinkler fire suppression system.

- The renovated areas shall be designed as an NFPA 13, Ordinary Hazard Group 1 system hydraulically calculated utilizing the area density method by the contractor for 0.15 gpm per sq.ft over 1500 sq.ft. Calculated demand including hose stream requirements shall fall no less than 10 percent below the available water supply (to be determined).

- The existing CPVC piping within the new storage area will be removed. The new fire protection system shall utilize all Schedule 40 pipe and fittings. All other components shall be rated for 300 psi. Sprinkler heads in areas with acoustic tile ceilings shall be chrome plated, recessed heads with chrome plated steel escutcheons. Areas with unfinished exposed ceilings will be provided with rough brass upright heads. Sprinklers throughout to be ordinary temperature rated except for electrical rooms/closets which shall be intermediate temperature rated and mechanical rooms to be provided with high temperature rated heads.

.2 Building 22

- The fire alarm system for the renovation will connect to, and extend from, the existing building fire alarm system.

- All existing sprinkler piping within the project boundary to be demolished back to nearest main at project boundary. The new fire protection system for the renovation areas will connect to, and extend from, the existing building wet pipe sprinkler fire suppression system.

- The renovated areas shall be designed as an NFPA 13, Ordinary Hazard Group 1 system hydraulically calculated utilizing the area density method by the contractor for 0.15 gpm per sq.ft over 1500 sq.ft. Calculated demand including hose stream requirements shall fall no less than 10 percent below the available water supply (to be determined).

- The new fire protection system shall utilize all Schedule 40 pipe and fittings. All other components shall be rated for 300 psi. Sprinkler heads in areas with acoustic tile ceilings shall be chrome plated, recessed heads with chrome plated steel escutcheons. Areas with unfinished exposed ceilings will be provided with rough brass upright heads. Sprinklers throughout to be ordinary temperature rated except for electrical rooms/closets which shall be intermediate temperature rated heads.

CHAPTER 6

STRUCTURAL

1. Applicable Codes and Standards

- International Building Code – 2009 Edition
- American Society of Civil Engineers - Minimum Design Loads for Buildings and Other Structures - ASCE 7-05
- Department of Veterans Affairs Seismic Design Requirements H-18-8
- VA Program Guide PG-18-15 Volume C
- VA Structural Design Manual For Hospital Projects - August 2009
- American Concrete Institute - Building Code Requirements for Structural Concrete – ACI 318-08
- American Institute of Steel Construction - Manual of Steel Construction – Thirteenth Edition - AISC 360-05
- American Welding Society - Structural Welding Code for Steel – ASW D1.1
- American Society for Testing and Materials – ASTM Standards

2. Design Loads

1. Dead loads for the purpose of structural design are the actual self-weight of the permanent building construction materials. In addition to the self-weight of the structure, the following additional dead loads are to be included in the design:

- Partitions in Administrative Services Area: 20 PSF
- HVAC Units 5,000 LBS (+/-)

2. Design live loads to be supported are as follows:

- Administrative Services 80 PSF
- Corridors 100 PSF
- Light Storage 125 PSF
- Mechanical Areas 150 PSF

3. Snow Load:

- Ground Snow Load (Pg) 30 PSF
- Snow Importance Factor (Is) 1.2
- Exposure Factor (Ce) 1.0
- Thermal Factor (Ct) 1.2

4. Wind Load:

- Basic Wind Velocity 90 MPH (3-second gust)
- Exposure Category B
- Wind Importance Factor (Iw) 1.15

5. Seismic Load:

- Occupancy Category IV
- Seismic Importance Factor (Ie) 1.5
- 0.2 Second Spectral Response Acceleration Ss 0.228g
- 1.0 Second Spectral Response Acceleration S1 0.057g
- Soil Site Classification C
- Seismic Design Category C
- Seismic Force-Resisting System: N/A
- Analysis Procedure: N/A

6. All load combinations shall be in conformance with the listed codes and standards.

3. Structural Systems

1. Building 19:

- New mechanical equipment will be supported from the existing structure. Penetrations through the existing structure may be required to provide a pathway for mechanical services.

2. Building 22:

- The proposed project area was originally constructed as a bowling alley, and is recessed several feet below the adjacent finished floor elevation. The existing recessed floor is constructed of cast-in-place concrete, and a wood-framed platform has been built over a portion of this concrete floor. The existing wood-framed floor platform is proposed to be removed, with a new elevated slab constructed over the existing recessed concrete floor structure. The new slab will be supported on structural steel framing, and will match the existing floor elevation.

- A new HVAC unit is proposed to be located outside the building on grade, adjacent to the project area. The unit is proposed to be elevated on steel dunnage framing, over an exterior concrete slab on grade. It is understood by the design team that this support configuration is the preference of the DVA Lebanon.

- Penetrations through the existing structure may be required to provide a pathway for mechanical services.

4. Structural Materials

1. Concrete

- Minimum Compressive Strength: f'c=4,500 psi

- Maximum Water-Cementitious Materials Ratio: 0.45

- Minimum Cementitious Materials Content: 500 lb/cu. yd.

- Air Content: 4.5 to 5.5 percent

- Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

- Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Maximum Coarse-Aggregate Size: 1 1/2 inch nominal.

- Air-Entraining Admixture: ASTM C 260.

- High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

2. Structural Steel

- Rectangular and Square HSS: ASTM A 500/A 500M, Grade B (Fy = 46 ksi).

- Round HSS: ASTM A500, Grade B (Fy = 42 ksi).

- Channels, Angles, M, S-Shapes: ASTM A 36/A 36M (Fy=36 ksi).
- Plate: ASTM A 36/A 36M (Fy=36 ksi).
- Wide Flange Shapes: ASTM A992 (Fy = 50 ksi)

5. Structural Special Inspections

1. In accordance with Section 1704 of the international building code, and all applicable state and local requirements, an independent approved agency shall make periodic and/or continuous inspections of the construction progress in accordance with the following requirements:

Steel Construction	Section 1704.3, Table 1704.3
Concrete Construction	Section 1704.4, Table 1704.4

CHAPTER 7

HAZARDOUS MATERIALS

1. GENERAL

.1 A previous hazardous material investigation associated with Building 19 and Building 22 was performed in August and September of 2010. The report was sent to Miller-Remick by the Lebanon VA, and has been included with this design narrative in Appendix E.

.2 As part of this project, a new investigation was performed within both Building 19 and Building 22. The reports of which are included in Appendix E.

2. ASBESTOS CONTAINING MATERIALS

.1 The 2010 hazardous materials inspection appears to have been limited solely to visually apparent suspect ACM, and did not include intrusive means of access such as opening wall and ceiling cavities to identify hidden and concealed ACM within wall cavities and chases.

.2 As part of this project, samples were taken from floors, walls, wall cavities and chases, ceiling cavities, as well as pipe insulation and submitted for testing.

CHAPTER 8

CRITICAL PATH METHOD (CPM)

1. PROJECT MASTER SCHEDULE

.1 Refer to Appendix A for the Project Master Schedule, which shows the projected overall schedule from the Design Phase Services Notice-To-Proceed (NTP), to the final turnover after completion of the design.

.2 The schedule is not final and will be expanded and updated throughout the design and construction of this project.

2. PHASING

.1 Phase I – Building 19 – Temporarily Relocate Existing EMS Storage

- Prior to construction, temporarily relocate EMS storage items in Building 19 by consolidating them into underutilized space already within the existing Building 22 EMS storage area as well as into alternate locations within the VA. Possible locations within Building 19 include the adjacent office space outside of the existing elevator machine room and the adjacent storage room west of the elevator machine room.

.2 Phase II – Building 19 – Emergency Cache

- Once Phase I has been substantially completed, demolition and construction can begin in Building 19.

.3 Phase III – Building 19 and 22 – Emergency Cache

- Once Phase II has been substantially completed, Emergency Cache items currently stored within Building 22 can be relocated into the new clean and sterile storage areas of the new Emergency Cache within Building 19.

.4 Phase IV – Building 22 – EMS Storage

- Once Phase III has been substantially completed, EMS items currently stored in Building 22 can then be moved to the space vacated by Emergency Cache in Building 22 so demolition and construction can begin on the new EMS storage area within Building 22.

.5 Phase V – Building 22 - EMS Storage

- Once Phase IV has been substantially completed, EMS storage items temporarily housed in the existing Emergency Cache area in Building 22 can be moved to the new EMS storage area in Building 22.

.6 Phase VI – Building 22 – Office Suite

- Once Phase V has been substantially completed, demolition and construction can begin on the Office Suite within Building 22.

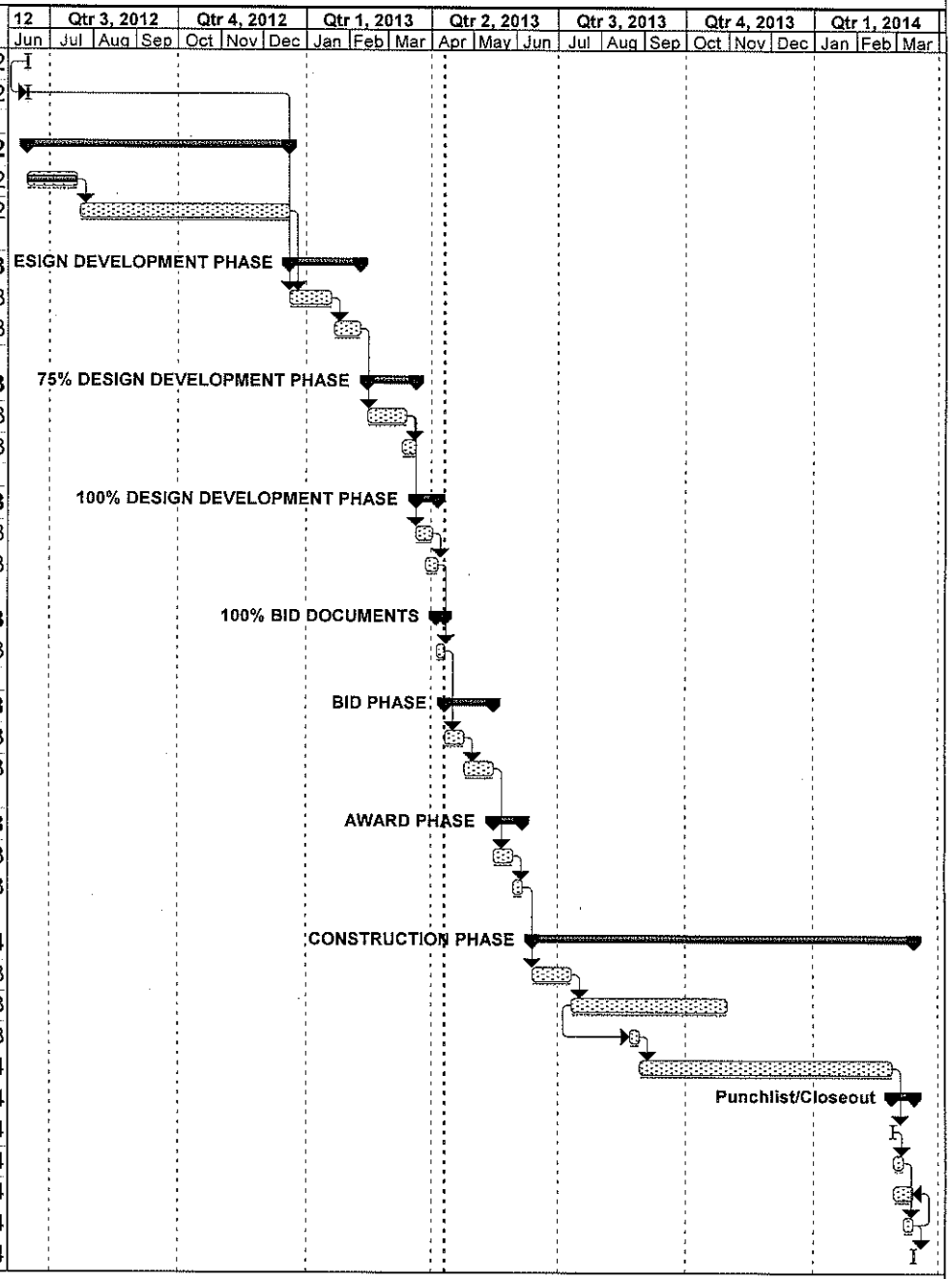
APPENDIX A

CRITICAL PATH METHOD (CPM) PROJECT SCHEDULE

Miller-Remick LLC

Improve Emergency Cache
Lebanon, PA VAMC
VA Project 595-11-127

ID	Task Name	Duration	Start	Finish
1	Notice to Proceed	1 day	6/15/12	6/15/12
2	Kick-Off Meeting	1 day	6/15/12	6/15/12
3				
4	**SCHEMATIC DESIGN PHASE**	**134 days**	**6/15/12**	**12/19/12**
5	Prepare Design Documents	26 days	6/15/12	7/20/12
6	VA Review	108 days	7/23/12	12/19/12
7				
8	**25% DESIGN DEVELOPMENT PHASE**	**37 days**	**12/20/12**	**2/8/13**
9	Prepare Design Documents	22 days	12/20/12	1/18/13
10	VA Review	15 days	1/21/13	2/8/13
11				
12	**75% DESIGN DEVELOPMENT PHASE**	**25 days**	**2/14/13**	**3/20/13**
13	Prepare Design Documents	20 days	2/14/13	3/13/13
14	VA Review	8 days	3/11/13	3/20/13
15				
16	**100% DESIGN DEVELOPMENT PHASE**	**12 days**	**3/21/13**	**4/5/13**
17	Prepare Design Documents	8 days	3/21/13	4/1/13
18	VA Review	7 days	3/28/13	4/5/13
19				
20	**100% BID DOCUMENTS**	**4 days**	**4/5/13**	**4/10/13**
21	Prepare Design Documents	4 days	4/5/13	4/10/13
22				
23	**BID PHASE**	**25 days**	**4/11/13**	**5/15/13**
24	Advertise for Bid	2 wks	4/11/13	4/24/13
25	Bid Period	3 wks	4/25/13	5/15/13
26				
27	**AWARD PHASE**	**15 days**	**5/16/13**	**6/5/13**
28	Evaluate Bids	2 wks	5/16/13	5/29/13
29	Award Contract	1 wk	5/30/13	6/5/13
30				
31	**CONSTRUCTION PHASE**	**197 days**	**6/13/13**	**3/14/14**
32	Submittal Review	4 wks	6/13/13	7/10/13
33	Procurement of Long Lead Items	16 wks	7/11/13	10/30/13
34	Mobilization	1 wk	8/22/13	8/28/13
35	Major Construction	130 days	8/29/13	2/26/14
36	**Punchlist/Closeout**	**12 days**	**2/27/14**	**3/14/14**
37	Pre-final inspection	1 day	2/27/14	2/27/14
38	Develop Punch List	5 days	2/28/14	3/6/14
39	As-built drawings/ O&M Manuals	10 days	2/28/14	3/13/14
40	Final cost analysis	5 days	3/7/14	3/13/14
41	Final Inspection	1 day	3/14/14	3/14/14

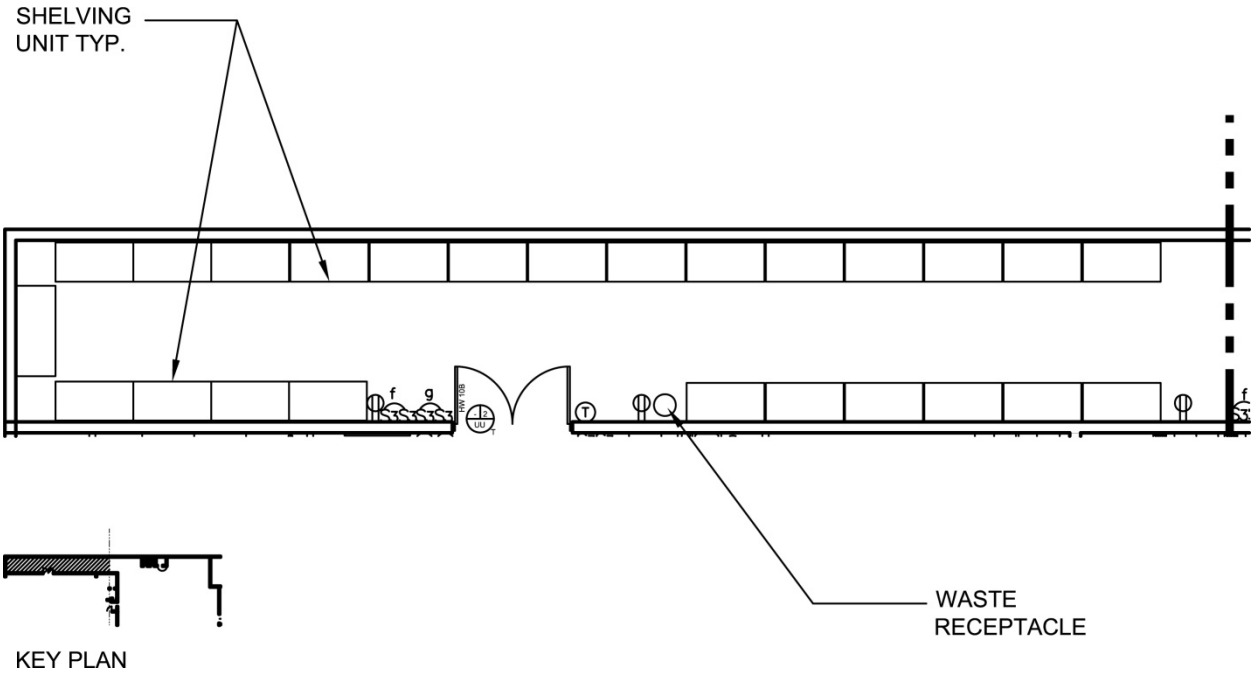


APPENDIX B

ARCHITECTURAL

Sterile and Non-Sterile Storage Area (Surgery) (ORSS1)

Floor Plan



KEY PLAN

NSF (NSM) per Space Criteria

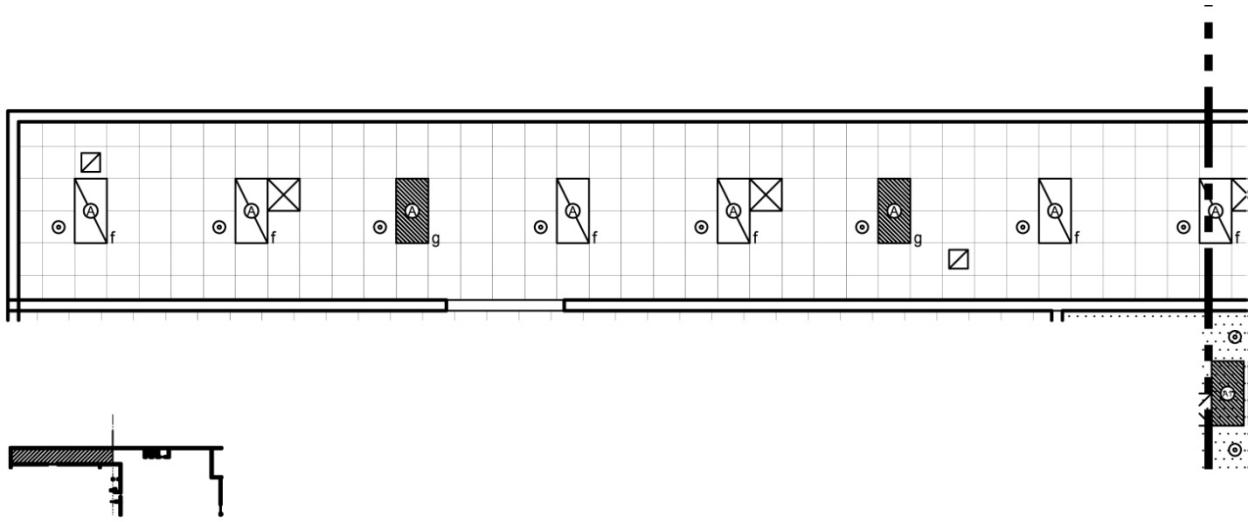
M2 1 0 2’-8” 5’-4” 10’-8”Ft

Scale: 3/32” =1’-0”

NOTE: Guide plates are graphical representations of selected room types, i illustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Sterile and Non-Sterile Storage Area (Surgery) (ORSS1)

Reflected Ceiling Plan



KEY PLAN

NSF (NSM) per Space Criteria

M2 1 0 2’-8” 5’-4” 10’-8”Ft

Scale: 3/32” =1’-0”

NOTE: Guide plates are graphical representations of selected room types, i illustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Sterile and Non-Sterile Storage Area (Surgery) (ORSS1)

Design Standards

ARCHITECTURAL

Ceiling:	AT (SP)
Ceiling Height:	9'-0" (2700 mm)
Wall Finish:	GWB (SC)
Wainscot:	--
Base:	WSF
Floor Finish:	WSF
Slab Depression:	--
Sound Protection:	--
Notes:	--

SPECIAL EQUIPMENT

Wall Protection	--

LIGHTING

General:	20 FC – 0.5 W/SF (MIN)
Special:	As Shown

Notes:

1) Fixture A: 2'x4' (600 mm x 1200 mm) recessed, grid mounted fluorescent light fixture, UL listed for wet location, prismatic lens with gasketing, w/ F32T8 lamps 3500•K, CRI=70 (minimum).
2) The foot-candle level is average maintained.
3) Provide ballasts per fixture for desired switching configuration. To provide a uniform lighting level, switch inner lamp(s) on first switch and outer lamps on second switch.
4) Exact quantity, location, and lamping of light fixtures shall be chosen to meet the foot-candle requirement.

POWER

General:	As Shown
Emergency:	As Shown
Notes:	--

COMMUNICATION/SPECIAL SYSTEMS

Data:	Yes
Telephone:	Yes
Intercom:	--
Nurse Call:	--
Public Address:	--
Radio/Entertainment:	--
MATV:	--
CCTV:	--
MID:	--
Security/Duress:	--
VTEL:	--
VA Satellite TV:	--
Notes:	--

HEATING, VENTILATING AND AIR CONDITIONING

Inside Design Conditions:	
Dry-Bulb Temperature:	73F (23C)
Relative Humidity:	30% - 55%
Minimum Total Air Changes per Hour:	4
Room Air Exhaust Required:	Yes, 100%
Special Exhaust or General Exhaust:	General Exhaust
Room Air Return Permitted:	No
Room Air Balance:	Positive (+)
Notes:	

PLUMBING AND MEDICAL GASES

Cold Water:	--
Hot Water:	--
Laboratory Air:	--
Laboratory Vacuum:	--
Sanitary Drain:	--
Reagent Grade Water:	--
Medical Air:	--
Medical Vacuum:	--
Oxygen:	--
Notes:	--

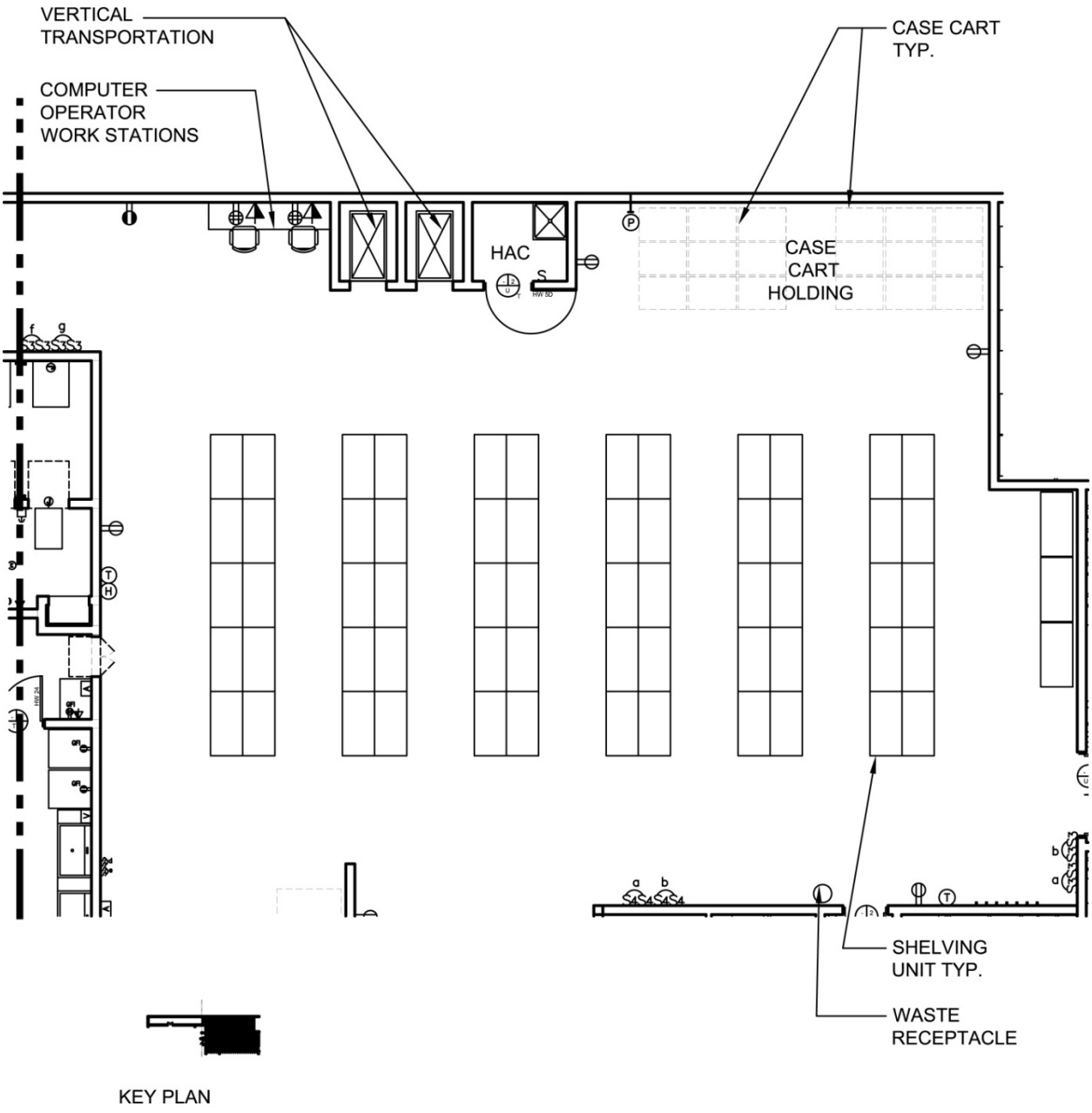
Sterile and Non-Sterile Storage Area (Surgery) (ORSS1)

Equipment List

JSN	SYMBOL	QTY	AI	DESCRIPTION
		AR		Shelves, Freestanding, Open Wire, on Wheels Freestanding open wire shelves on wheels. Bottom shelf is to be solid and 8" from the floor.
A5145		1	CC	Hook, Garment, Double, Stainless Steel, Surface Mounted A surface mounted, satin finish stainless steel, double garment hook. Equipped with a concealed mounting bracket that is secured to a concealed wall plate. For general purpose use throughout the facility to hang various items of apparel.
F2000		1	VV	Basket, Wastepaper, Round, Metal Round wastepaper basket, approximately 18" high x 16" diameter. This metal unit is used to collect and temporarily store small quantities of paper refuse in patient rooms, administrative areas and nursing stations.
		AR	CC	Receptacle, electrical, duplex, 120 volt (PG-18-1, MCS 26 27 26.
		AR	CC	Receptacle, electrical, quadruplex, 120 volt, for computer equipment items (PG-18-1, MCS 26 27 26).
		AR	CC	Telephone/Data combination outlet (PG-18-1, MCS 27 31 00).

Sterile and Non-Sterile Storage Area (Nursing Units) (SRS01)

Floor Plan



KEY PLAN

NSF (NSM) per Space Criteria

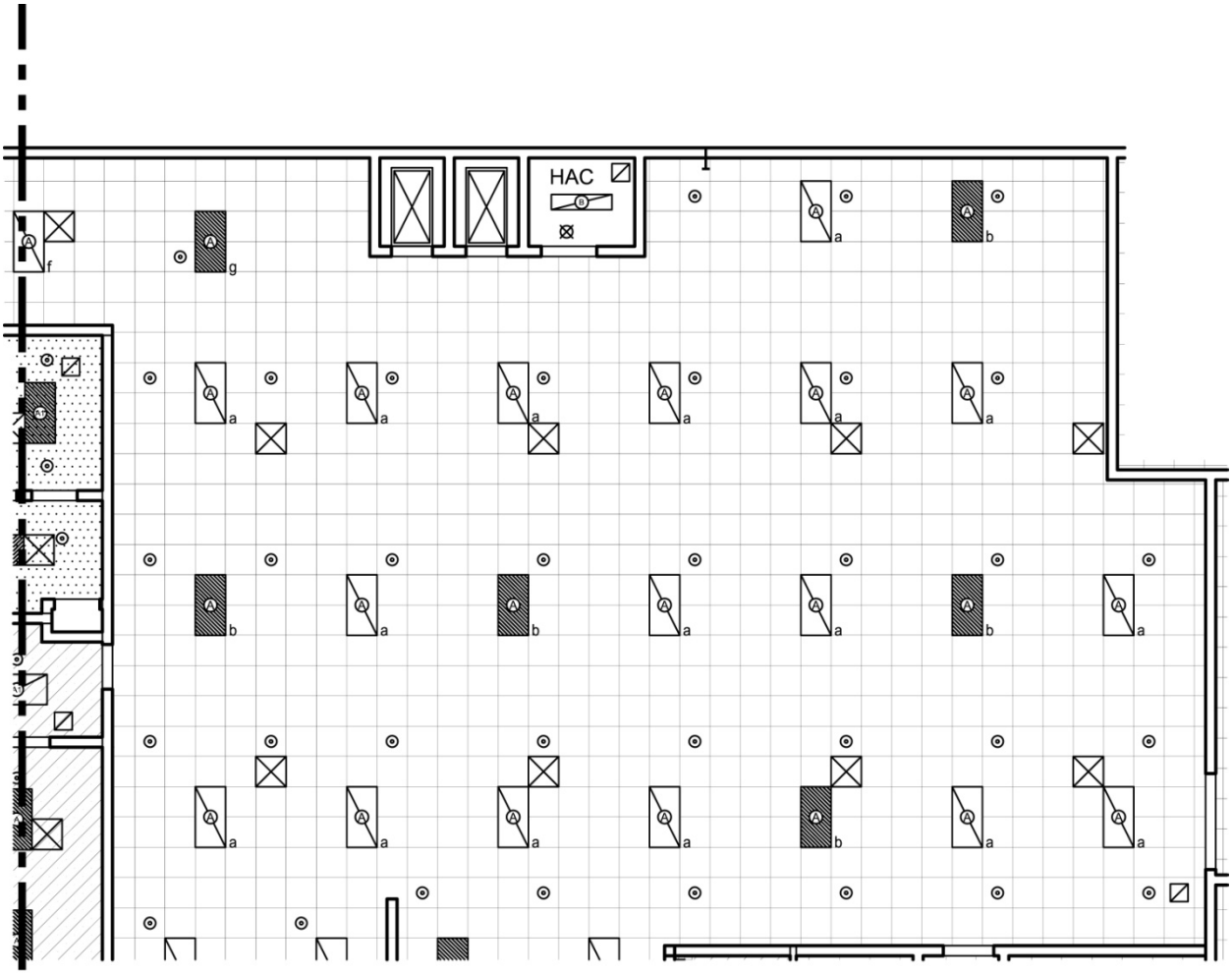
M2 1 0 2’-8” 5’-4” 10’-8”Ft

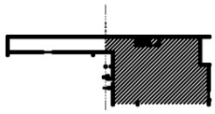
Scale: 3/32” =1’-0”

NOTE: Guide plates are graphical representations of selected room types, i illustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Sterile and Non-Sterile Storage Area (Nursing Units) (SRS01)

Reflected Ceiling Plan





KEY PLAN

NSF (NSM) per Space Criteria

M2 1 0 2’-8” 5’-4” 10’-8”Ft

Scale: 3/32” =1’-0”

NOTE: Guide plates are graphical representations of selected room types, i illustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Sterile and Non-Sterile Storage Area (Nursing Units) (SRS01)

Design Standards

ARCHITECTURAL

Ceiling:	AT (SP)
Ceiling Height:	9'-0" (2700 mm)
Wall Finish:	GWB (SC)
Wainscot:	--
Base:	RB
Floor Finish:	VCT
Slab Depression:	--
Sound Protection:	--
Notes:	--

SPECIAL EQUIPMENT

Wall Protection	--

LIGHTING

General:	20 FC – 0.5 W/SF (MIN)
Special:	As Shown

Notes:

1) Fixture A: 2'x4' (600 mm x 1200 mm) recessed, grid mounted fluorescent light fixture, UL listed for wet location, prismatic lens with gasketing, w/ F32T8 lamps 3500•K, CRI=70 (minimum).).
2) The foot-candle level is average maintained.
3) Provide ballasts per fixture for desired switching configuration. To provide a uniform lighting level, switch inner lamp(s) on first switch and outer lamps on second switch.
4) Exact quantity, location, and lamping of light fixtures shall be chosen to meet the foot-candle requirement.

POWER

General:	As Shown
Emergency:	Egress lighting
Notes:	--

COMMUNICATION/SPECIAL SYSTEMS

Data:	--
Telephone:	--
Intercom:	--
Nurse Call:	--
Public Address:	--
Radio/Entertainment:	--
MATV:	--
CCTV:	--
MID:	--
Security/Duress:	--
VTEL:	--
VA Satellite TV:	--
Notes:	--

HEATING, VENTILATING AND AIR CONDITIONING

Inside Design Conditions:	
Dry-Bulb Temperature:	73F (23C)
Relative Humidity:	30% - 55%
Minimum Total Air Changes per Hour:	4
Room Air Exhaust Required:	Yes, 100%
Special Exhaust or General Exhaust:	General Exhaust
Room Air Return Permitted:	No
Room Air Balance:	Note 1)

Notes:

1) Positive (+) to Clean Receiving & Breakout Area

PLUMBING AND MEDICAL GASES

Cold Water:	--
Hot Water:	--
Laboratory Air:	--
Laboratory Vacuum:	--
Sanitary Drain:	--
Reagent Grade Water:	--
Medical Air:	--
Medical Vacuum:	--
Oxygen:	--
Notes:	--

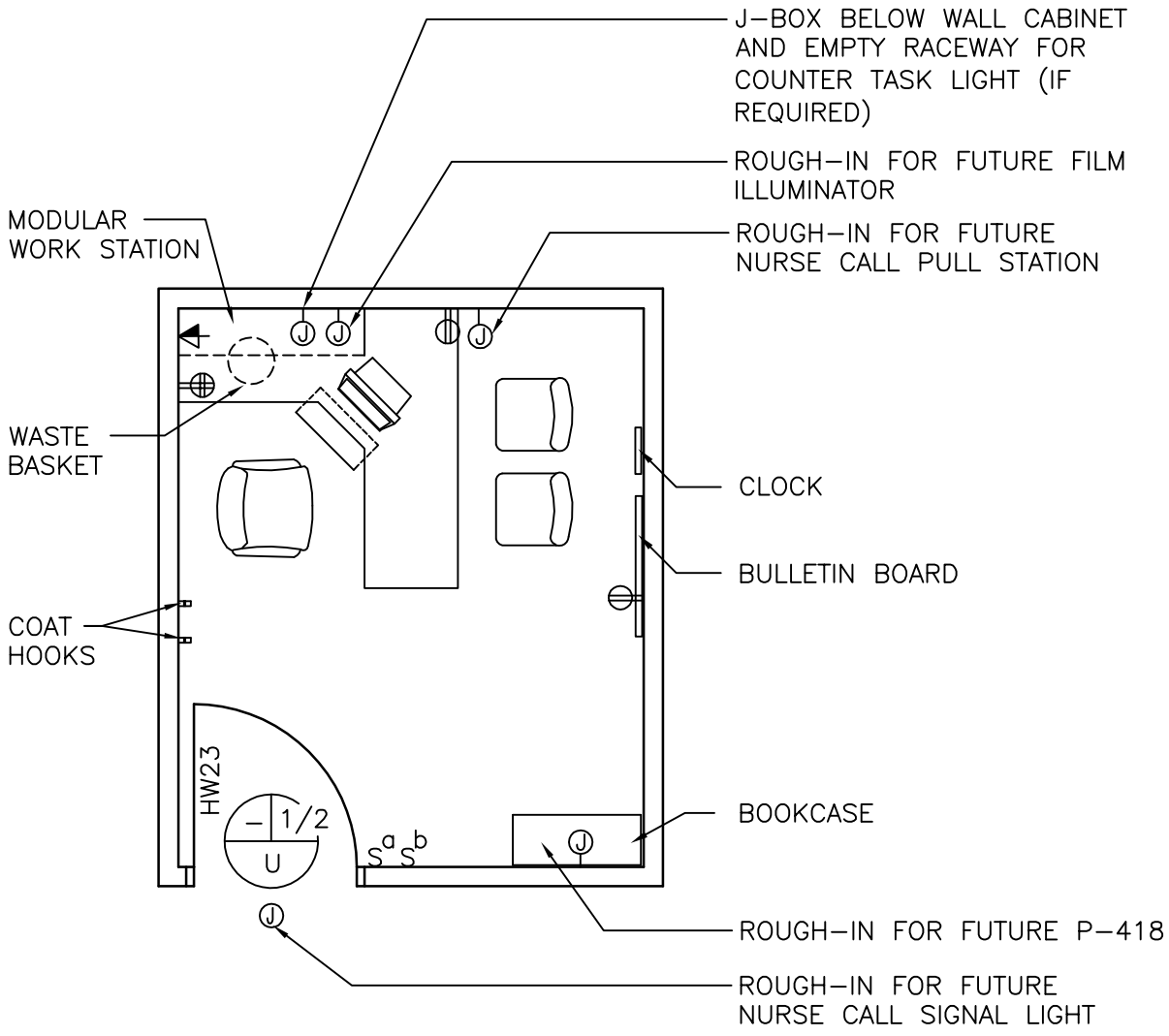
Sterile and Non-Sterile Storage Area (Nursing Units) (SRS01)

Equipment List

JSN	SYMBOL	QTY	AI	DESCRIPTION
		AR		Shelves, Freestanding, Open Wire, on Wheels Freestanding open wire shelves on wheels. Bottom shelf is to be solid and 8” from the floor.
A5145		1	CC	Hook, Garment, Double, Stainless Steel, Surface Mounted A surface mounted, satin finish stainless steel, double garment hook. Equipped with a concealed mounting bracket that is secured to a concealed wall plate. For general purpose use throughout the facility to hang various items of apparel.
F2000		1	VV	Basket, Wastepaper, Round, Metal Round wastepaper basket, approximately 18" high X 16" diameter. This metal unit is used to collect and temporarily store small quantities of paper refuse in patient rooms, administrative areas and nursing stations.
M2070		AR	VV	Shelving, Storage, 77x36x18 Storage shelving unit approximately 77" H X 36" W X 18" D. Corrosion resistant baked enamel, galvanized or stainless steel open unit with adjustable shelves. The closed version is also available. For use in the storage room.
		AR		Shelves, Freestanding, Open Wire, on Wheels Freestanding open wire shelves on wheels. Bottom shelf is to be solid.
		AR		Closed transport carts.
		AR	CC	Receptacle, electrical, duplex, 120 volt (PG-18-1, MCS 26 27 26).

Office (OFA01)(OFA02)(OFD01)(OFD03)(OFDC1)(SEC01)
Floor Plan

CONSIDER PROVIDING BACKING AND ROUGH-INS FOR CONVERSION TO EXAM ROOM-SEE GUIDE PLATE 4-76 SIMILAR.



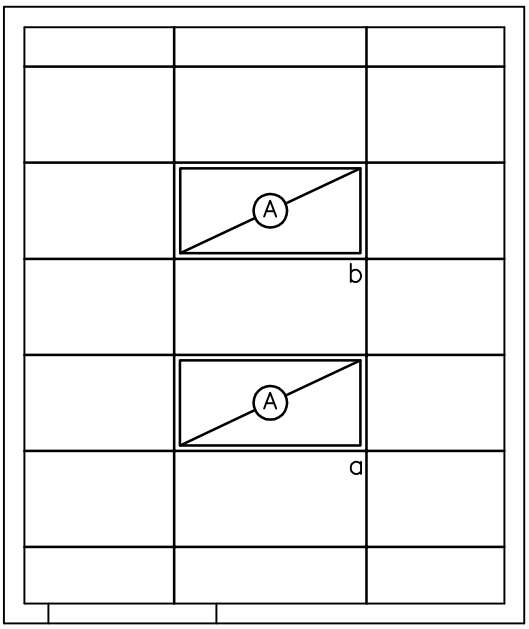
Typical: 120 NSF/ 11.2 NSM (Shown Above)
Minimum: 80 NSF/ 7.4 NSM
Maximum: 150 NSF/ 13.9 NSM

SCALE $\frac{1}{4}$" = 1'-0"

M2 1 0 1 2 4Ft

NOTE: Guide plates are graphical representations of selected room types, i llustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Office (OFA01)(OFA02)(OFD01)(OFD03)(OFDC1)(SEC01)
Reflected Ceiling Plan



Typical: 120 NSF/ 11.2 NSM (Shown Above)
Minimum: 80 NSF/ 7.4 NSM
Maximum: 150 NSF/ 13.9 NSM

SCALE $\frac{1}{4}$" = 1'-0"

M 2 1 0 1 2 4Ft

NOTE: Guide plates are graphical representations of selected room types, i llustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Office (OFA01) (OFA02) (OFD01) (OFD03) (OFDC1) (SEC01)

Design Standards

ARCHITECTURAL

Ceiling:	AT
Ceiling Height:	9'-0" (2700 mm)
Wall Finish:	GWB-P
Wainscot:	--
Base:	RB
Floor Finish:	CPT
Slab Depression:	--
Sound Protection:	STC 40
Notes:	--

SPECIAL EQUIPMENT

--

LIGHTING

General: --

Special: --

Notes:
1) 2' x 4' (600 mm x 1200 mm) recessed fluorescent light fixture, parabolic louver, w/ F32T8 lamps 3500°K, CRI=70 (minimum).
2) The foot-candle level is average maintained.
3) Provide ballasts per fixture for desired switching configuration. To provide a uniform lighting level, switch inner lamp(s) on first switch and outer lamps on second switch.
4) Exact quantity, location, and lamping of light fixtures shall be chosen to meet the foot-candle requirement.
5) Fixture description for alternate 80 and 150 NSF rooms is the same as described in Note 1 above. Orient the two fixtures for 150 NSF room in the same manner as shown for 120 NSF room. Orient single fixture and grid for 80 NSF room at 90° from orientation shown in 150 NSF room. For 80 and 150 NSF rooms, increase fixture wattage by 50%.

POWER

General:	As Shown
Emergency:	As Shown

Notes:
1) Coordinate location and height of work station receptacles with modular furniture.

COMMUNICATION/SPECIAL SYSTEMS

Data:	Yes
Telephone:	Yes
Intercom:	--
Nurse Call:	Rough-in only
Public Address:	--
Radio/Entertainment:	--
MATV:	--
CCTV:	--
MID:	--
Security/Duress:	--
VTEL:	--
VA Satellite TV:	--

Notes:
1) Coordinate location and height of work station telephone/data outlets with modular furniture.

HEATING, VENTILATING AND AIR CONDITIONING

Inside Design Conditions:	70°F (21°C) to 75°F (24°C) Dry-Bulb Temperature 30 Percent to 50 Percent Relative Humidity
Minimum Air Changes per Hour:	4
100% Exhaust:	No
100% Outside Air:	No
Room Air Balance:	Neutral (0)
Dedicated Exhaust System:	No
Occupancy:	2
AC Load (Equipment):	As Required
AC Load-(Light):	As Required
Notes:	--

PLUMBING AND MEDICAL GASES

Cold Water:	Rough-in only
Hot Water:	Rough-in only
Laboratory Air:	--
Laboratory Vacuum:	--
Sanitary Drain:	Rough-in only
Reagent Grade Water:	--
Medical Air:	--
Medical Vacuum:	--
Oxygen:	--
Notes:	--

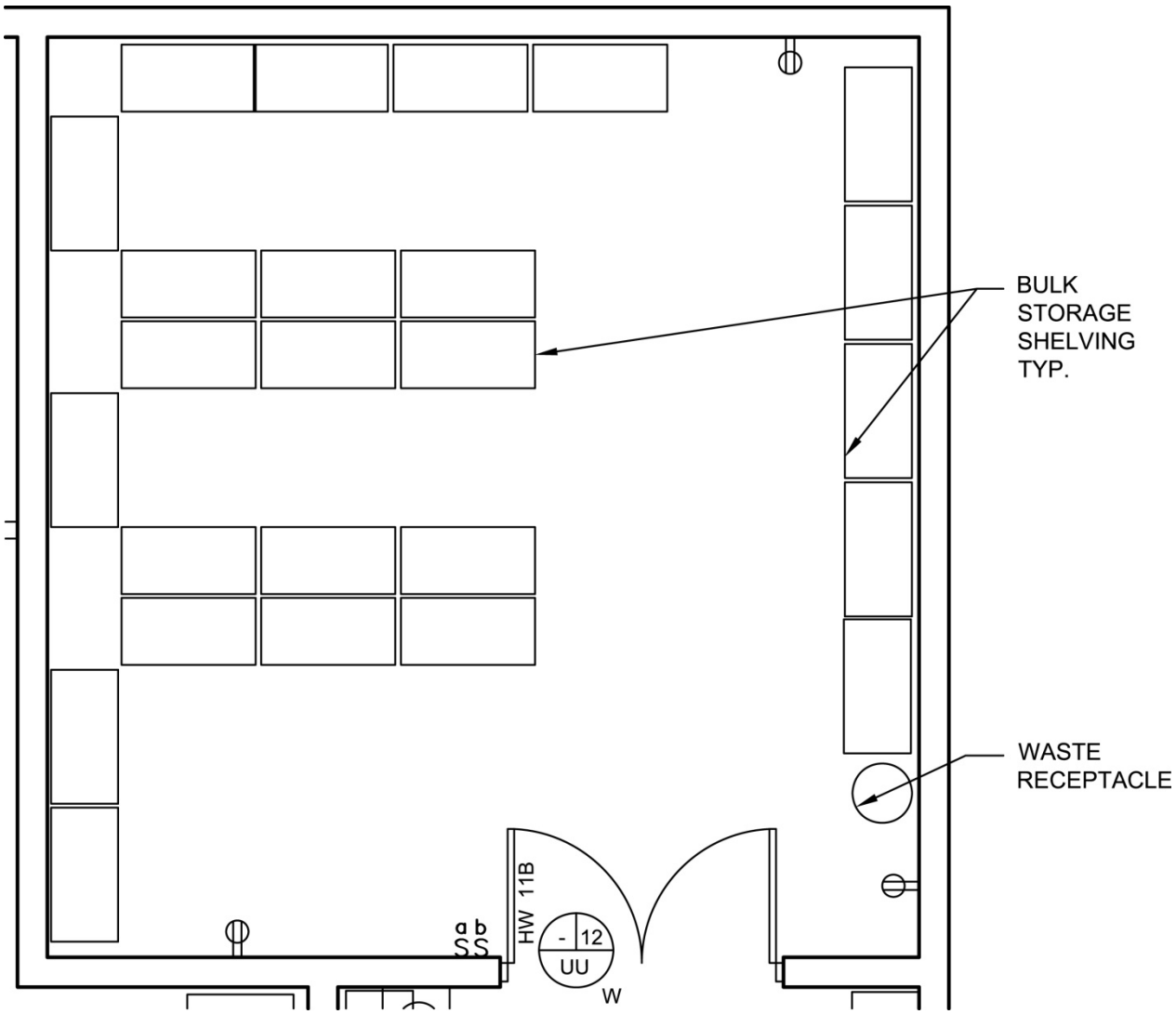
Office (OFA01) (OFA02) (OFD01) (OFD03) (OFDC1) (SEC01)

Equipment List

JSN	SYMBOL	QTY	AI	DESCRIPTION
	P-418	1	CC	Rough-in for lavatory, sensor control (PG-18-1, MCS 22 40 00; PG-18-4, NCS SD 22 40 00)
A1010		1	CC	Outlet, telephone/data, wall mounted (PG-18-1, MCS 27 15 00)
		1	CC	Receptacle, electrical, quadruplex, for computer equipment items (PG-18-1, MCS 26 27 26)
		AR	CC	Receptacle, electrical, duplex (PG-18-1, MCS 26 27 26)
		1	CC	Rough-in for nurse call, emergency station, and corridor signal light (PG-18-1, MCS 27 52 23)
E0210		1	VV	Modular work station with under counter keyboard tray, overhead storage, and wall hanger strips.
F0205		1	VV	Chair, rotary, with arms
F0120		1	VV	Bookcase, sectional, each section, 33” x 13” x 75” (825 mm x 325 mm x 1875 mm) with 10” (250 mm) base
A5145		2	VV	Hook, coat, wall mounted
F2000		1	VV	Receptacle, waste, 13” (325 mm) diameter
M1801		1	VV	PC, computer system, with keyboard
F0210		2	VV	Chair, straight, without arms
F3010		1	VV	Bulletin board, 48” x 36” (1200 mm x 900 mm)
F3200		1	VV	Clock, atomic, battery operated
Refer to Examination Room Guide Plate (EXRG3) for location of following:				
		AR	CC	Provide backing for future wall mounted equipment and accessories: Sphygmomanometer Otoscope / Ophthalmoscope Glove dispenser Sharps container Paper towel dispenser
		1	CC	Rough-in j-box for future x-ray film illuminator

Bulk Storage Area (SRS01)

Floor Plan



NSF (NSM) per Space Criteria

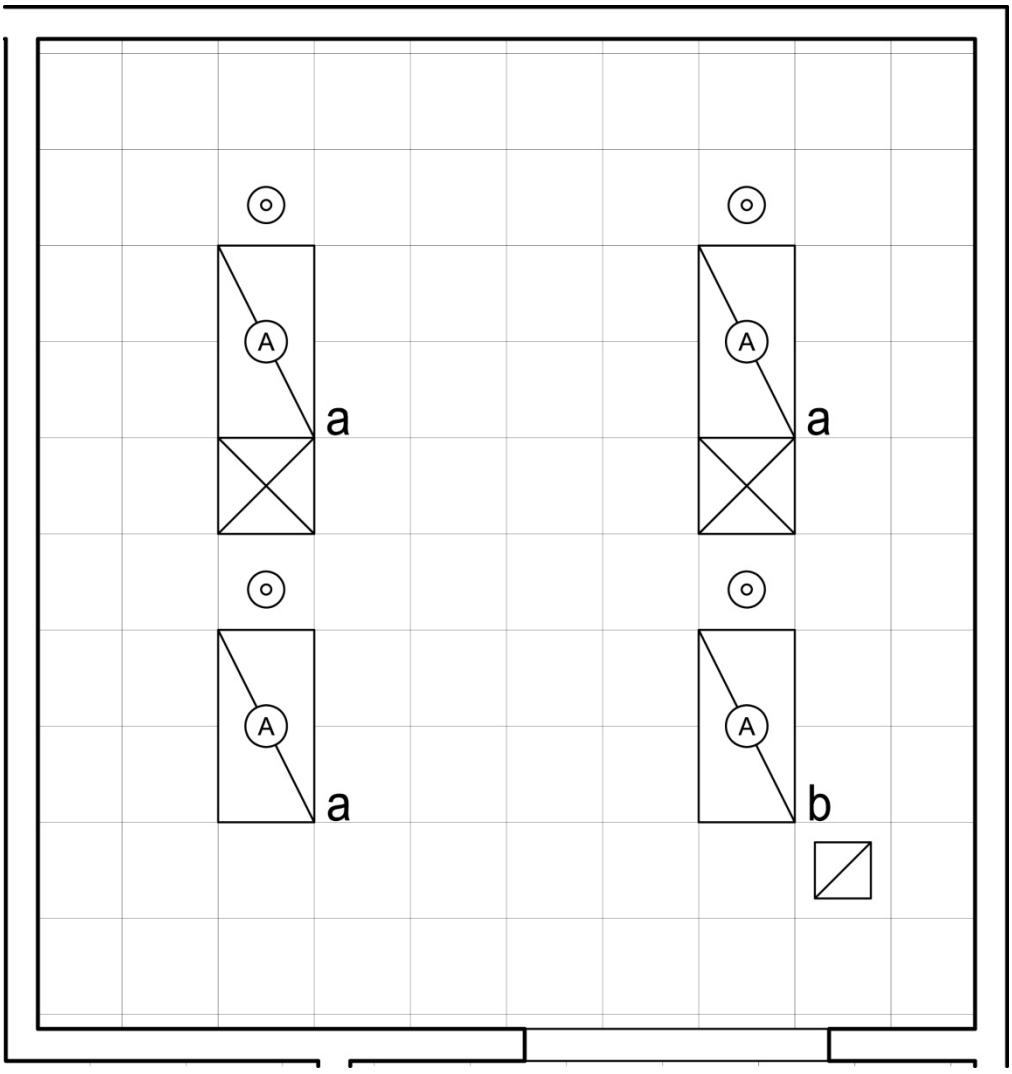
M2 1 0 1 2 4Ft

Scale: ¼” = 1’-0”

NOTE: Guide plates are graphical representations of selected room types, i illustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Bulk Storage Area (SRS01)

Reflected Ceiling Plan



NSF (NSM) per Space Criteria

M2 1 0 1 2 4Ft

Scale: ¼" = 1'-0"

NOTE: Guide plates are graphical representations of selected room types, i illustrating the integration of space, components, systems, and equipment. They provide typical configurations and general technical guidance, and are not intended to be project specific. Specific infrastructure design requirements are contained in VA Design Manuals and Space Planning Criteria located in the VA Technical Information Library.

Bulk Storage Area (SRS01)

Design Standards

ARCHITECTURAL	
Ceiling:	AT (SP)
Ceiling Height:	9'-0" (2700 mm)
Wall Finish:	GWB (SC)
Wainscot:	--
Base:	RB
Floor Finish:	VCT
Slab Depression:	--
Sound Protection:	--
Notes:	--

SPECIAL EQUIPMENT	
Wall Protection	--

LIGHTING	
General:	20 FC – 1 W/SF (MIN)
Special:	As Shown

Notes:

1) Fixture A: 2'x4' (600 mm x 1200 mm) recessed, grid mounted fluorescent light fixture, UL listed for wet location, prismatic lens with gasketing, w/ F32T8 lamps 3500•K, CRI=70 (minimum).`
2) The foot-candle level is average maintained.
3) Provide ballasts per fixture for desired switching configuration. To provide a uniform lighting level, switch inner lamp(s) on first switch and outer lamps on second switch.
4) Exact quantity, location, and lamping of light fixtures shall be chosen to meet the foot-candle requirement.

POWER	
General:	As Shown
Emergency:	Egress lighting
Notes:	--

COMMUNICATION/SPECIAL SYSTEMS	
Data:	--
Telephone:	--
Intercom:	--
Nurse Call:	--
Public Address:	--
Radio/Entertainment:	--
MATV:	--
CCTV:	--
MID:	--
Security/Duress:	--
VTEL:	--
VA Satellite TV:	--
Notes:	--

HEATING, VENTILATING AND AIR CONDITIONING	
Inside Design Conditions:	
Dry-Bulb Temperature:	73F (23C)
Relative Humidity:	30% - 55%
Minimum Total Air Changes per Hour:	4
Room Air Exhaust Required:	Yes, 100%
Special Exhaust or General Exhaust:	General Exhaust
Room Air Return Permitted:	No
Room Air Balance:	Neutral (0)
Notes:	--

PLUMBING AND MEDICAL GASES	
Cold Water:	--
Hot Water:	--
Laboratory Air:	--
Laboratory Vacuum:	--
Sanitary Drain:	--
Reagent Grade Water:	--
Medical Air:	--
Medical Vacuum:	--
Oxygen:	--
Notes:	--

Bulk Storage Area (SRS01)

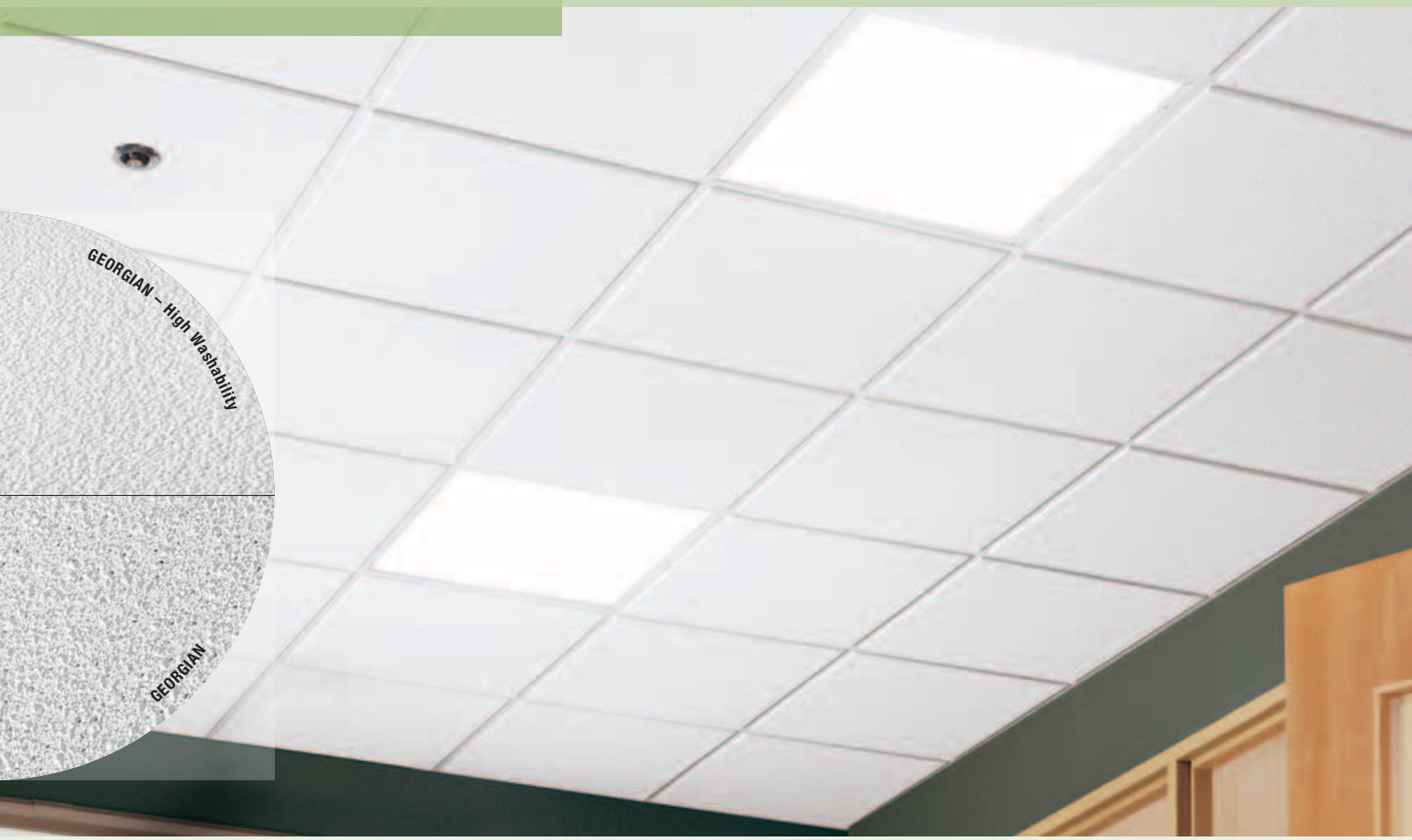
Equipment List

JSN	SYMBOL	QTY	AI	DESCRIPTION
F0530		1	VV	Cart, Trash Heavy duty trash cart, 42" high X 74" wide X 34" deep with two (2) solid non-marking rubber roller bearing wheels, two (2) swivel casters, 2000 pound capacity and tilt mechanism.
F2000		1	VV	Basket, Wastepaper, Round, Metal Round wastepaper basket, approximately 18" high X 16" diameter. This metal unit is used to collect and temporarily store small quantities of paper refuse in patient rooms, administrative areas and nursing stations.
M2055		1	VV	Shelving, Storage, Wire, with Adjustable Shelves Stationary, wire, shelving unit. Unit has fully adjustable shelves constructed of stainless steel. For use in general purpose storage areas. Shelving is provided in various sizes and configurations. Price provided is for a unit approximately 74"H x 18"D x 48"W with four shelves.
M2070		AR	VV	Shelving, Storage, 77x36x18 Storage shelving unit approximately 77" H X 36" W X 18" D. Corrosion resistant baked enamel, galvanized or stainless steel open unit with adjustable shelves. The closed version is also available. For use in the storage room.
		AR		Bulk shelving units.
		AR	CC	Receptacle, electrical, duplex, 120 volt (PG-18-1, MCS 26 27 26).

GEORGIAN™

Square Lay-in & Tegular

medium texture



Georgian Beveled Tegular with Prelude® 15/16" Exposed Tee grid (Pg. 215)

Key Selection Attributes

- Unique spatter-painted visual
- Excellent sound absorption (items 795, 796, 1750)

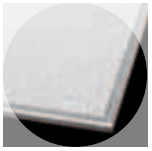
High Washability

- Durable –
  Washable
  Impact-resistant
  Scratch-resistant
  Scrubbable
- Meets USDA/FSIS guidelines for use in food processing establishments
- 30-Year Limited System Warranty against visible sag (excludes item 791), mold/mildew, and bacterial growth

Typical Applications

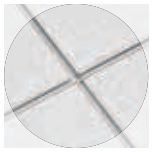
- Schools/classrooms
- Healthcare – assists in addressing HIPAA and FGI acoustical requirements (Items 795, 796 & 1750)
- Corridors/conference rooms
- Kitchen/food preparation (Items 793, 794, 828)
- Enclosed parking garages (Items 793, 794, 828)

Detail (Other Suspension Systems compatible. Refer to listing on page 170.)



Georgian
Beveled Tegular

Georgian
Beveled Tegular with
Prelude 15/16"
Exposed Tee grid



Georgian
Beveled Tegular with
Silhouette® 9/16"
Bolt-Slot grid 1/4" Reveal

Color

White (WH)

GEORGIAN™

Square Lay-in & Tegular

medium texture

Recycled Content: Up to 51%

armstrong.com/greengenie

LEED® Credits

Energy	Waste Mgmt	Recycled Content	Local Materials	Renewable Materials	Daylight & Views
✔	✔	✔	✔	✔	✔

Location Dependent

LEED for Schools

Acoustics	Low Emitting or CHPS
	✔

$$$$$

Visual Selection

Performance Selection

Dots represent highest level of performance.

Edge Profile	Suspension Detail Dwg. Pgs. 226-228	Item No.	Dimensions		UL Classified Acoustics NRC	CAC	Fire Rating	Light Reflect	Sag Resist	Anti-Microbial	Durable				Recycle Program
											Wash	Scrub	Impact	Scratch	
GEORGIAN															
9/16" Beveled Tegular	31-34, 54	**1753** **1753M**	2' x 2' x 5/8" 600 x 600 x 15mm		0.55	35	Class A	0.86 •	HumiGuard+ •	BioBlock+ •	•		•	•	•
15/16" Square Lay-in	1	**764** **764M**	2' x 2' x 5/8" 600 x 600 x 15mm		0.55	33	Class A	0.86 •	•	•	•		•	•	•
	1	**763** **763M**	2' x 4' x 5/8" 600 x 1200 x 15mm		0.55	33	Class A	0.86 •	•	•	•		•	•	•
	1	**898**	2' x 4' x 5/8"		0.55	35	Fire Guard	0.86 •	•	•	•		•	•	•
	1	**791** **791M**	30" x 5' x 3/4" 750 x 1500 x 19mm		0.55	33	Class A	0.86 •	Standard	•	•		•	•	•
15/16" Beveled Tegular	12	**1752** **1752M**	2' x 2' x 5/8" 600 x 600 x 15mm		0.55	35	Class A	0.86 •	•	•	•		•	•	•
GEORGIAN – High Acoustics															
15/16" Square Lay-in	1	**796** **796M**	2' x 2' x 3/4" 600 x 600 x 19mm		0.65 •	35	Class A	0.86 •	•	•	•		•	•	•
	1	**795** **795M**	2' x 4' x 3/4" 600 x 1200 x 19mm		0.65 •	35	Class A	0.86 •	•	•	•		•	•	•
15/16" Angled Tegular	7	**1750** **1750M**	2' x 2' x 3/4" 600 x 600 x 19mm		0.65 •	38 •	Class A	0.86 •	•	•	•		•	•	•
GEORGIAN – High Washability, Unperforated															
15/16" Square Lay-in	1	**794** **794M**	2' x 2' x 5/8" 600 x 600 x 15mm		N/A	33	Class A	0.88 •	•	•	•	•	•	•	•
	1	**793** **793M**	2' x 4' x 5/8" 600 x 1200 x 15mm		N/A	33	Class A	0.88 •	•	•	•	•	•	•	•
	1	**828**	2' x 4' x 5/8"		N/A	35	Fire Guard	0.88 •	•	•	•	•	•	•	•

Suspension Systems

15/16" Prelude®

9/16" Interlude®, Silhouette® Bolt-Slot, Sonata®, Suprafine®, Trimlok® Screw-Slot

Item 1753-CAC 33 on 9/16" Interlude, Sonata, Suprafine

Physical Data

Material
Wet-formed mineral fiber

Surface Finish
793, 794, 828: factory-applied vinyl latex paint
All other items: factory-applied latex paint

Fire Performance
ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less. (UL labeled)
Fire Guard™: A fire resistive ceiling when used in applicable UL assemblies

ASTM E1264 Classification
Type III, Form 2, Pattern C E
Items 794, 793, 828 –
Type IX, Form 2, Pattern G
Fire Class A

Sag Resistance
HumiGuard® Plus – superior resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.

VOC/Formaldehyde Emissions
(Excludes items 796, 795, 1750)
Meets CA Dept. of Health Services Standard Practice for the testing of VOC Emissions and is listed on CHPS High Performance Products Database for Low-Emitting Materials.

(Items 796, 795, 750)
Meets CA Dept. of Health Services Standard Practice for the testing of VOC Emissions depending on ceiling use and building parameters. Specific project data is required to evaluate performance.

Anti Mold/Mildew & Bacteria
BioBlock® Plus contains an anti-microbial treatment and provides guaranteed resistance against growth of mold/mildew and Gram-positive and Gram-negative odor/stain-causing bacteria for 30 years.

Insulation Value
R Factor - 1.6 (BTU units)
R Factor - 0.28 (Watts units)

30-Year Performance Guarantee & Warranty Information
See warranty details in the back of this catalog

Weight; Square Feet/Carton
763, 793 – 0.67 lbs/SF; 96 SF/ctn
764, 794, 1752, 1753 – 0.72 lbs/SF; 64 SF/ctn
791 – 0.76 lbs/SF; 75 SF/ctn
828, 898 – 1.13 lbs/SF; 64 SF/ctn
796, 1750 – 1.31 lbs/SF; 48 SF/ctn
795 – 1.38 lbs/SF; 64 SF/ctn

Health Zone™ ULTIMA®

Square Lay-in, Tegular

fine texture

Recycled Content: 70%

armstrong.com/greengenie

LEED® Credits

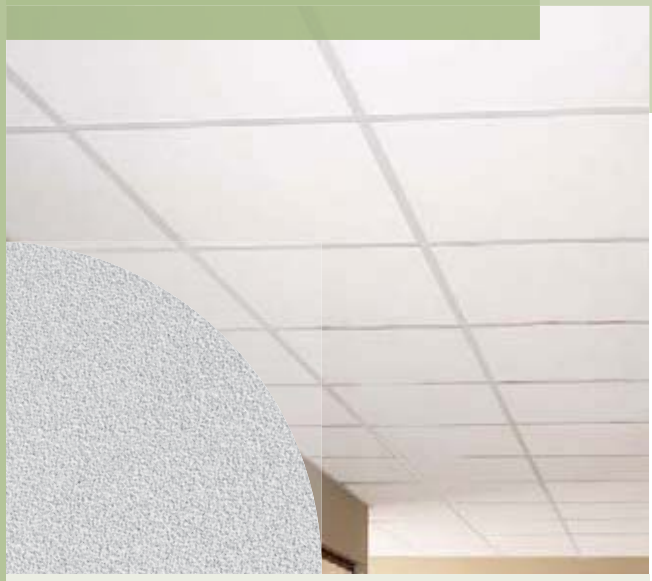
Energy	Waste Mgmt	Recycled Content	Local Materials	Renewable Materials	Daylight & Views
✔	✔	✔	✔	✔	✔

Location Dependent

LEED for Schools

Acoustics	Low Emitting or CHPS
✔	✔

$$$$$



Health Zone Ultima Square Lay-in with Prelude® 15/16" Exposed Tee grid

Key Selection Attributes

- Clean Rooms up to ISO Class 5 (Class 100) (items 1935 & 1937)
- Exceeds FGI Guidelines for acoustics and cleanablility in general healthcare spaces
- Meets USDA/FSIS guidelines for use in food processing areas
- Long-lasting water-repellency; Washable and Scrubbable
- Smooth, clean, durable finish – Impact-, Scratch-, and Soil-resistant; safe for use with disinfectants
- Excellent sound absorption
- Visual complements Ultima and Optima®
- NEW Now available with Ultima® Create!™ custom colors and images
- Available with Ultima Themes™ images – Blooms, Bubbles, Dragonflies, and Stars
- 30-Year Limited System Warranty against visible sag, mold/mildew, and bacterial growth

Typical Applications

Clean Rooms (items 1935 & 1937)

Healthcare

- Patient rooms
- Treatment rooms
- Nurses stations
- Emergency rooms
- Semi-restricted surgical areas
- Corridors
- Lavatories and restrooms
- Kitchen/food prep areas

Color

White (WH)

Visual Selection

Performance Selection

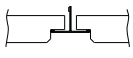
Dots represent highest level of performance.

Edge Profile	Grid Drawings Cat. pgs. 226-228 or armstrong.com/catdwg	Item No.	Dimensions		UL Classified Acoustics NRC	CAC	Fire Rating	Light Reflect	Sag Resist	Anti-Microbial	Durable						Recycle Program
Health Zone ULTIMA†																	
15/16" Square Lay-in	1, 2	**1935***	2' x 2' x 3/4"	☐	0.70	35	Class A	0.86	HumiGuard+	BioBlock+	Wash	Scrub	Water Repel	Impact	Scratch	Soil	Yes
					•			•	•	•	•	•	•	•	•	•	•
9/16" Beveled Tegular	31-33, 54	**1936***	2' x 2' x 3/4"	☐	0.70	35	Class A	0.86									
					•			•	•	•	•	•	•	•	•	•	•
15/16" Beveled Tegular	12, 2A	**1937**	2' x 2' x 3/4"	☐	0.70	35	Class A	0.86									
					•			•	•	•	•	•	•	•	•	•	•

* Ultima® Create!™ custom images and colors available for this item (see Ultima Create! Brochure CS-4374 for details). armstrong.com/ceilings (search: ultimacreate)

Suspension Systems

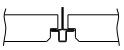
15/16"



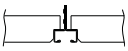
Prelude
AL Prelude Plus XL®
SS Prelude Plus XL

Clean Room™

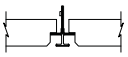
9/16"



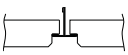
Interlude® XL



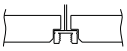
Silhouette® XL
1/4" or 1/8" Reveal



Sonata® XL



Suprafine®



Trimlok®
Screw-Slot

Physical Data

Material
Wet-formed mineral fiber with DuraBrite® acoustically transparent water-repellent membrane

Surface Finish
DuraBrite with factory-applied latex paint

Fire Performance
ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less. (UL labeled)

ASTM E1264 Classification
Type IV, Form 2, Pattern E
Fire Class A

Sag Resistance
HumiGuard® Plus – superior resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.

VOC/Formaldehyde Emissions
Meets CA Dept. of Health Services Standard Practice for the testing of VOC Emissions and is listed on CHPS High Performance Products Database for Low-Emitting Materials.

Anti Mold/Mildew & Bacteria
BioBlock® Plus contains an anti-microbial treatment and provides guaranteed resistance against growth of mold/mildew and Gram-positive and Gram-negative odor/stain-causing bacteria for 30 years.

Insulation Value
R Factor – 2.2 (BTU units)
R Factor – 0.39 (Watts units)

30-Year Performance Guarantee & Warranty Information
Details in back of catalog or at armstrong.com/warranty

Application Considerations
For Clean Room installations use full-size panels. Testing for Clean Room 5 (Class 100) was completed with full-size Lay-in (1935) and 15/16" Beveled Tegular (1937) with Clean Room 15/16" gasketed grid. For Clean Rooms that require field cut perimeter panels, use Lay-in panels (1935) or Tegular panels (1937) with Lay-in field cut panels at the perimeter.

Health Zone Ultima has an easy-to-clean, semi-gloss surface that is smoother in appearance than Ultima and Optima®. Health Zone Ultima will complement Ultima and Optima, but is not recommended for installation within the same room. Lighting conditions may emphasize the difference in gloss levels.

Cleaning Recommendations
To clean panel, use a clean, white cloth with water or a mild detergent and wipe surface. To disinfect panel, lightly spray surface and wipe clean with a clean, white cloth. Acceptable colorless disinfectants include:

- Sodium hypochlorite
- Isopropyl alcohol
- Hydrogen peroxide
- Quaternary ammonium

Weight; Square Feet/Carton
1.08 lbs/SF; 48 SF/ctn

MINERAL FIBER

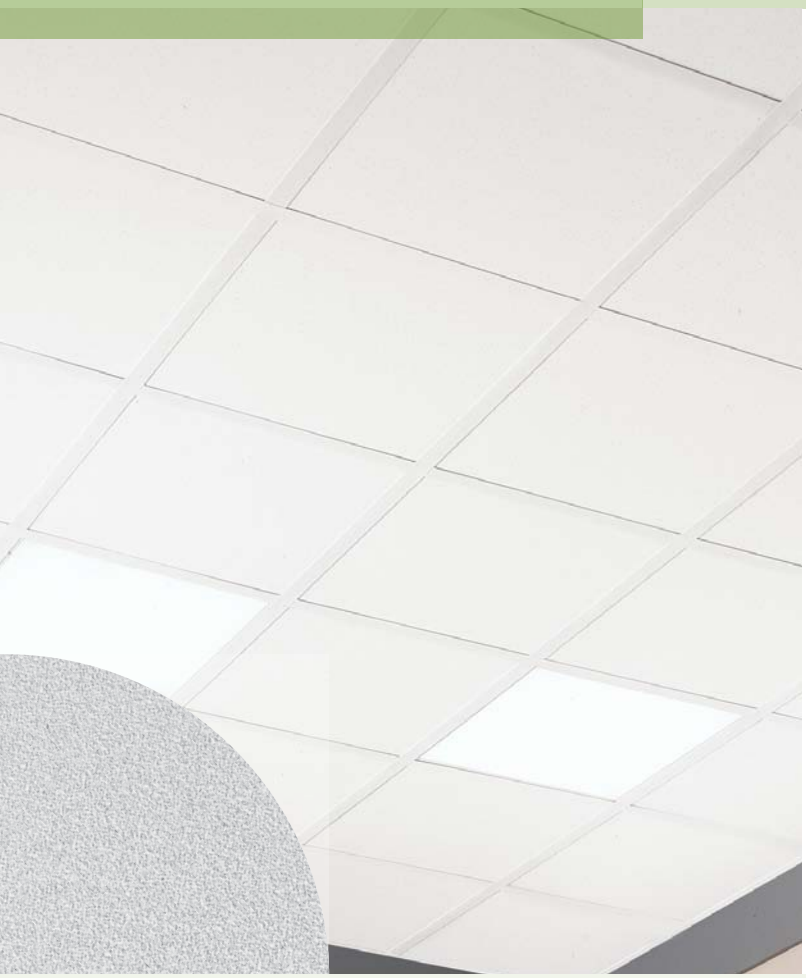
TechLine℠ / 1 877 ARMSTRONG
armstrong.com/ceilings (search: ultima)
CS-4066-1111

Clean Room™ FL & VL
Clean Room OPTIMA®, Clean Room ULTIMA®

Square Lay-in, Tegular

smooth texture

10-YEAR Availability Items 1715, 1716, 1720, 1721



Clean Room Ultima with Clean Room 15/16" grid (Pg. 210)

Clean Room Optima with Prelude® 15/16" Exposed Tee grid (Pg. 215)

Clean Room FL with Clean Room 1-1/2" Exposed Tee grid (Pg. 210)

Key Selection Attributes

- Clean Rooms up to ISO Class 5 (Class 100)
- Meets USDA/FSIS guidelines for use in food processing areas (excludes items 869, 871)
- Durable – Washable, Scrubbable, Soil-resistant
- Non-directional visual reduces installation time and scrap
- 30-Year Limited System Warranty against visible sag, mold/mildew, and bacterial growth

Clean Room Optima and Ultima Additional Benefits

- Exceeds FGI Guidelines for acoustics and cleanability in general healthcare spaces
- Long-lasting water-repellency

Typical Applications

Clean Room FL, Clean Room VL, Clean Room Ultima

Clean Rooms
Kitchens/food preparation areas
Laboratories
Healthcare

- Patient Rooms
- Treatment Rooms
- Semi-restricted surgical areas
- Emergency rooms

Clean Room Optima

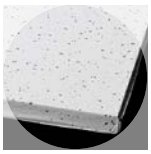
Clean Rooms
Kitchens/food preparation areas
Laboratories
Healthcare

- Patient rooms (walls-to-deck)
- Treatment rooms (walls-to-deck)
- Emergency rooms (walls-to-deck)
- Semi-restricted surgical areas (walls-to-deck)
- MRI rooms

VL (Perforated)

- Lavatories/restrooms

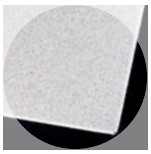
Detail (Other Suspension Systems compatible. Refer to listing on pages 151-152.)



Clean Room FL

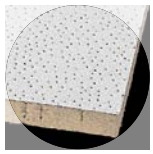
Clean Room VL

Clean Room Optima Square Lay-in



Clean Room Ultima Square Lay-in

Clean Room FL with Clean Room 1-1/2" Exposed Tee grid



VL

Color

White (WH) (Clean Room Optima, Clean Room Ultima, Clean Room VL & VL)

White with Gray Spatter (Clean Room FL)

Clean Room™ OPTIMA® Clean Room ULTIMA®

Square Lay-in, Tegular

smooth texture

Recycled Content: Up to 80%

armstrong.com/greengenie

LEED® Credits

Energy	Waste Mgmt	Recycled Content	Local Materials	Renewable Materials	Daylight & Views
✔	✔	✔	✔ Location Dependent		✔

LEED for Schools

Acoustics	Low Emitting or CHPS
✔	✔

$$$$$

Visual Selection

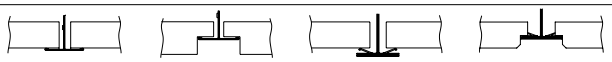
Performance Selection

Dots represent highest level of performance.

Edge Profile	Suspension Detail Dwg. Pgs. 226-228	Item No.	Dimensions		UL Classified Acoustics NRC	CAC	AC	Fire Rating	Light Reflect	Sag Resist	Anti-Microbial	Durable						Recycle Program
												Wash	Scrub	Water Repel	Impact	Scratch	Soil	
Clean Room OPTIMA (see Health Zone™ Optima, Items 3114, 3115, 3214, 3215, Pgs. 113-114)																		
15/16" Square Lay-in	2	**3114**	2' x 2' x 1"	□	0.95 ●	N/A	190 ●	Class A	0.86 ●	HumiGuard+ ●	Inherent ●	●	●	●	●	●	●	●
	12, 2	**3115**	2' x 4' x 1"	▭	0.95 ●	N/A	190 ●	Class A	0.86 ●	●	●	●	●	●	●	●	●	●
	12, 2	**3314**	2' x 2' x 1-1/2"	□	0.95 ●	29	190 ●	Class A	0.86 ●	●	●	●	●	●	●	●	●	–
	12, 2	**3315**	2' x 4' x 1-1/2"	▭	0.95 ●	29	190 ●	Class A	0.86 ●	●	●	●	●	●	●	●	●	–
15/16" Square Tegular	12, 2	**3214**	2' x 2' x 1"	□	0.95 ●	N/A	190 ●	Class A	0.86 ●	●	●	●	●	●	●	●	●	●
	12, 2	**3215**	2' x 4' x 1"	▭	0.95 ●	N/A	190 ●	Class A	0.86 ●	●	●	●	●	●	●	●	●	●
	12, 2	**3316**	2' x 2' x 1-1/2"	□	0.95 ●	29	190 ●	Class A	0.86 ●	●	●	●	●	●	●	●	●	–
	12, 2	**3317**	2' x 4' x 1-1/2"	▭	0.95 ●	29	190 ●	Class A	0.86 ●	●	●	●	●	●	●	●	●	–
Clean Room ULTIMA (see Health Zone Ultima, Items 1935 and 1937, Pg. 173)																		
15/16" Square Lay-in	2	**1935**	2' x 2' x 3/4"	□	0.70 ●	35	N/A	Class A	0.86 ●	HumiGuard+ ●	Inherent ●	●	●	●	●	●	●	●
15/16" Beveled Tegular	12, 2A	**1937**	2' x 2' x 3/4"	□	0.70 ●	35	N/A	Class A	0.86 ●	●	●	●	●	●	●	●	●	●

Suspension Systems

15/16"



Prelude®
Prelude Plus
AL Prelude Plus XL®

Clean Room

Physical Data

Material
3114, 3115, 3214, 3215 – Fiberglass with DuraBrite® acoustically transparent membrane
1935, 1937 – Wet formed mineral fiber with DuraBrite acoustically transparent water-repellent membrane

Surface Finish
DuraBrite with factory-applied latex paint

Fire Performance
ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less. (UL labeled)

ASTM E1264 Classification
3114, 3115, 3214, 3215, 3314, 3315, 3316, 3317 – Type XII, Form 2, Pattern E
1935, 1937 – Type IV, Form 2, Pattern E
Fire Class A

Sag Resistance
HumiGuard® Plus – superior resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.

VOC/Formaldehyde Emissions
Meets CA Dept. of Health Services Standard Practice for the testing of VOC Emissions and is listed on CHPS High Performance Products Database for Low-Emitting Materials.

Anti Mold/Mildew & Bacteria
3114, 3115, 3214, 3215, 3314, 3315, 3316, 3317 – Fiberglass substrate is inherently resistant to the growth of mold, mildew, and bacteria.

1935, 1937 – BioBlock® Plus contains an anti-microbial treatment and provides guaranteed resistance against growth of mold/mildew and Gram-positive and Gram-negative odor/stain-causing bacteria for 30 years.

Acoustical Details
3314, 3315, 3316, and 3317 have CAC backing. Products with CAC backing are not UL Classified for acoustics. Contact TechLine for independant laboratory acoustic testing.

Insulation Value
3114, 3115, 3214, 3215, 3314, 3315, 3316, 3317 –
R Factor – 4.0 (BTU units)
R Factor – 0.70 (Watts units)
1935, 1937 –
R Factor – 2.2 (BTU units)
R Factor – 0.39 (Watts units)

30-Year Performance Guarantee & Warranty Information
See warranty details at armstrong.com/warranty

Application Considerations

Clean Room Optima (Health Zone Optima)
For Clean Room installations with Clean Room Optima, use full-size panels with Clean Room grid.

Clean Room Ultima (Health Zone Ultima)
For Clean Room installations with Clean Room Ultima, use full-size panels (items 1935 and 1937) with Clean Room grid. Clean Room Ultima has been tested to withstand 500 wash and scrub cycles.

Cleaning Recommendations
To clean panel, use a clean, white cloth with water or a mild detergent and wipe surface. To disinfect panel, lightly spray surface and wipe clean with a clean, white cloth. Acceptable colorless disinfectants include:
- Sodium hypochlorite
- Isopropyl alcohol
- Hydrogen peroxide
- Quaternary ammonium

Weight; Square Feet/Carton
3114, 3115, 3214, 3215 – 0.45 lbs/SF; 96 SF/ctn
1935, 1937 – 1.08 lbs/SF; 48 SF/ctn
3314, 3315, 3316, 3317 – 0.78 lbs/SF; 64 SF/ctn

Note: For assistance on proper Clean Room installation, contact TechLine at 1 877 ARMSTRONG. For Clean Room installations, use Clean Room Optima or Clean Room Ultima only with Armstrong Clean Room Grid Systems.

Recycled Content: Up to 70%

armstrong.com/greengenie

LEED® Credits

Energy	Waste Mgmt	Recycled Content	Local Materials	Renewable Materials	Daylight & Views
		✔	✔	✔	

Location Dependent

LEED for Schools

Acoustics	Low Emitting or CHPS
	✔

$$$$$

Clean Room™ FL/ Clean Room VL & VL

Square Lay-in, Tegular

smooth texture

Visual Selection

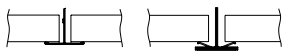
Performance Selection

Dots represent highest level of performance.

Edge Profile	Suspension Detail Dwg. Pgs. 226-228	Item No.	Dimensions	UL Classified Acoustics NRC	CAC	Fire Rating	Light Reflect	Sag Resist	Anti-Microbial	Durable: Wash	Scrub	Water Repel	Soil	Recycle Program
Clean Room FL Field Unit – Class 5 (Class 100)														
15/16" or 1-1/2" Square Lay-in	1,2	**1715** **1715M**	2' x 2' x 3/4" 600 x 600 x 19mm	0.55	35	Class A	0.79	HumiGuard+	BioBlock+	Wash	Scrub	Water Repel	Soil	
								•	•	•	•	•	•	–
	1,2	**1716** 1716M	2' x 4' x 3/4" 600 x 1200 x 19mm	0.55	35	Class A	0.79	•	•	•	•	•	•	–
Clean Room FL Border Unit – Class 5 (Class 100)														
15/16" or 1-1/2" Square Lay-in	1,2	**1720** **1720M**	2' x 2' x 5/8" 600 x 600 x 15mm	N/A	35	Class A	0.79	•	•	•	•	•	•	–
	1,2	**1721** **1721M**	2' x 4' x 5/8" 600 x 1200 x 15mm	N/A	35	Class A	0.79	•	•	•	•	•	•	–
Clean Room VL Unperforated – Class 5 (Class 100)														
15/16" or 1-1/2" Square Lay-in	1	**868** **868M**	2' x 2' x 5/8" 600 x 600 x 15mm	N/A	40 •	Fire Guard	0.80	•	•	•	•	•	•	–
	1	**870** **870M**	2' x 4' x 5/8" 600 x 1200 x 15mm	N/A	40 •	Fire Guard	0.80	•	•	•	•	•	•	–
VL Perforated														
15/16" or 1-1/2" Square Lay-in	1	**869** **869M**	2' x 2' x 5/8" 600 x 600 x 15mm	0.55	35	Fire Guard	0.78	•	•	•	•	•	•	–
	1	**871** **871M**	2' x 4' x 5/8" 600 x 1200 x 15mm	0.55	35	Fire Guard	0.78	•	•	•	•	•	•	–

Suspension Systems

15/16"



Prelude®
Prelude XL®
Fire Guard

Clean Room

1-1/2"

Clean Room

Physical Data

Material
Wet-formed mineral fiber

Surface Finish
1715, 1716, 1720, 1721 – Soil-resistant polyester film
868, 870, 869, 871 – Vinyl-faced membrane

Fire Performance
ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less. (UL labeled)
Fire Guard™: A fire resistive ceiling when used in applicable UL assemblies

ASTM E1264 Classification
1715, 1716, 1720, 1721 – Type IV, Form 2, Pattern G H
868, 870, – Type IV, Form 2, Pattern E
869, 871 – Type IV, Form 2, Pattern C E
Fire Class A

Sag Resistance
HumiGuard® Plus – superior resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.

VOC/Formaldehyde Emissions
Meets CA Dept. of Health Services Standard Practice for the testing of VOC Emissions and is listed on CHPS High Performance Products Database for Low-Emitting Materials.

Anti Mold/Mildew & Bacteria
BioBlock® Plus contains an anti-microbial treatment and provides guaranteed resistance against growth of mold/mildew and Gram-positive and Gram-negative odor/stain-causing bacteria for 30 years.

Insulation Value
R Factor – 1.5 (BTU units)
R Factor – 0.26 (Watts units)

30-Year Performance Guarantee & Warranty Information
See warranty details at armstrong.com/warranty

Application Considerations

Clean Room FL
If acoustical absorption is required, specify a combination of field and border units – field units for use as full-size panels only; border units for use where panels must be cut on the job (borders, sprinkler head penetrations, etc.).

VL Perforated
869, 871 – VL Perforated is not intended for Clean Room and kitchen/food preparation applications. Use unperforated product – 868, 870.

Clean Room VL
Clean Room VL has been tested to withstand 10,000 scrub cycles.
Clean Room VL is not appropriate for applications where germicidal lamps are being used.

Weight; Square Feet/Carton
1715 – 1.02 lbs/SF; 48 SF/ctn
1716 – 1.02 lbs/SF; 64 SF/ctn
1720 – 1.04 lbs/SF; 48 SF/ctn
1721 – 1.17 lbs/SF; 64 SF/ctn
868, 869 – 1.10 lbs/SF; 48 SF/ctn
870, 871 – 1.11 lbs/SF; 64 SF/ctn

Note: For assistance on proper Clean Room installation, contact TechLine at 1 877 ARMSTRONG. For Clean Room installations, use Clean Room FL or Clean Room VL only with Armstrong Clean Room Grid Systems.

Clean Room™ *ClimaPlus*™

HRC
High Recycled Content

USDA CERTIFIED BIOBASED PRODUCT
PRODUCT 89%

USG

Clean Room Class 10M–100M Panels with *ClimaPlus* Performance/ Donn DXLA Suspension System

See LEED report tool at **usgdesignstudio.com** for detailed sustainability information.

Features and Benefits

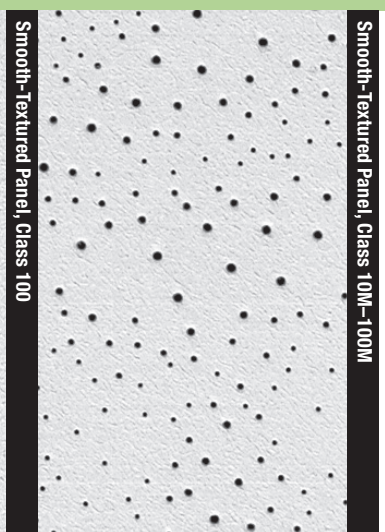
– Clean Room™ *ClimaPlus*™ Class 100 and Class 10M–100M panels have an embossed, vinyl-laminated face with sealed back and edges for use in Class 100 or 10M–100M clean rooms.
– USDA Certified Biobased Product.
– Firecode® product designed to meet life-safety codes.
– *ClimaPlus* 30-year lifetime system warranty against visible sag.

Applications

– Clean rooms
– Laboratories
– Surgical areas/ emergency rooms
– MRI rooms
– Kitchens/food prep areas (Class 100 only)

Substrate

– Water-felted mineral fiber



To order samples, go to usg.com

Flat White
050

Clean Room™ *ClimaPlus*™

To order samples/literature:
Web: usg.com
E-mail: samplit@usg.com
Fax: 888 874.2348
Technical Services:
800 USG.4YOU (800 874.4968)

Websites:
usg.com
usgdesignstudio.com
For the most up-to-date technical information:
usgdesignstudio.com

30 Year System Warranty
– No visible sag
– Mold/mildew protection

	Edge[5]	Panel Size	Class[2]	Item No.	NRC[3]	CAC Min.	LR[4]	Color	Grid Options	Recycled Content[1]	Panel Cost
Clean Room™ *ClimaPlus*™ Class 100 Panels	SQ	**2'x2'x5/8" Unperforated**		**56099**	—	35	.79	White	A, B, C, D, E	52% HRC	**$$$**
		2'x4'x5/8" Unperforated		**56091**	—	35	.79	White	A, B, C, D, E	52% HRC	**$$$**
Clean Room *ClimaPlus* Class 10M-100M Panels[7]	SQ	**2'x2'x5/8" Perforated**		**56060**	.55	35	.79	White	A, B, C, D, E	52% HRC	**$$$**
		2'x4'x5/8" Perforated		**56090**	.55	35	.79	White	A, B, C, D, E,	52% HRC	**$$$**

UL Classified

Legend

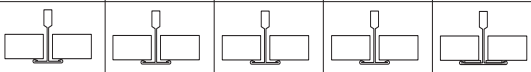
Low Emissions (VOC)
Low-emitting performance meets CA Specification 01350 (CA Dept. of Health Services Standard Practice for the testing of VOC emissions) and is listed on the CHPS database for low-emitting materials. USG Certificate of Compliance for Low VOC Emissions also available on usg.com.

High Recycled Content
Classified as containing greater than 50% total recycled content. Total recycled content is based on product composition of post-consumer and pre-consumer (post-industrial) recycled content per FTC guidelines.

Firecode®

Grid Profile Options

A	B	C	D	E
DX®/DXL™	DXLA™	ZXLA™	AX™	CE™6



Physical Data/ Footnotes

Product literature
Data sheet: SC1811

ASTM E1264 classification
Class 100: Type X, Pattern GI
Class 10-100M: Type X, Pattern CGI

ASTM E84 surface burning characteristics
Class A
Flame spread: 25
Smoke developed: 50

Weight
1.1 lbs./sq. ft. (Class 100 panels)
1.2 lbs./sq. ft. (Class 10M-100M panels)

Thermal resistance
R-1.6

Maximum backloading
See USG 30-Year Limited Warranty Commercial Applications SC2102.

Maintenance
Can be cleaned easily with a damp sponge, mild detergent and water. Do not use acetate, ammonia, or highly concentrated chlorine, bromide or other harsh chemicals.

Notes
1. For details, see LEED report tool at usgdesignstudio.com.
2. Fire-rated items: see UL design details.
3. NRC rating for Clean Room *ClimaPlus* Class 100 panels is .10. USG does not consider a ceiling panel to be acoustically rated if NRC is less than .50.
4. LR values are shown as averages.
5. Field-cut edges of Clean Room panels may be sealed with white latex paint.
6. Clean-room-rated applications require a suspension system with gasketed tee flanges such as Donn CE.
7. Not intended for kitchen/food prep applications. Use unperforated product (Class 100)—item numbers 56099 and 56091.
8. This product has achieved both BioPreferred initiatives: Federal Procurement Preference and Certified Product Labeling. See the complete listing of all USG ceiling panels on biopreferred.gov website.

Manufactured by USG Interiors, LLC
550 West Adams Street
Chicago, IL 60661

Safety First! Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read MSDS and literature before specification and installation.

SC1811/rev. 3-13

Printed in U.S.A.

APPENDIX C

HEATING, VENTILATING, and AIR CONDITIONING (HVAC)

VA Medical Center 595
Lebanon, PA 17042

MEDICAL CENTER MEMORANDUM 134-02

June 19, 2012

MANAGEMENT OF ENVIRONMENTALLY CONTROLLED CLEAN/STERILE SUPPLY ROOMS

1. **PURPOSE:** To establish guidelines for clean/sterile storage supply rooms, including control of temperature, humidity, air exchange and purpose. Policies, procedures and responsibilities to ensure safe storage and assessment of clean/sterile medical supplies are further defined in this guidance.

2. **INTRODUCTION:**

a. Clean/Sterile supplies are necessary for patient care. To ensure availability, supplies may be stored in bulk at a primary storage location, at point of use in secondary storage locations or at immediate use in examination room storage locations.

b. Supplies stored over time must be maintained in a temperature and humidity controlled environment to ensure product integrity.

c. Various professional organizations including Association of Operating Room Nurses (AORN), American Association of Medical Instruments (AAMI), Veteran's Health Administration (VHA) and American Institute of Architects (AIA) identify suggested environmental parameters for clean/sterile storage. In addition, the Under Secretary for Health for Clinical Operations provided guidelines for primary storage locations in a memorandum dated January 04, 2012, which replaces previous recommendations in the VA Handbook 7176 – Supply Processing and Distribution.

3. **POLICY**: It is the policy of this medical center to provide clean/sterile medical supplies safe for patient use.

a. Clean/Sterile supplies are acquired, reprocessed (if necessary), and placed into storage for use following existing standard operating procedures in the Logistics and Sterile Processing Service(SPS) policy manuals.

b. Clean/Sterile supply stock is rotated on a "First In First Out" (FIFO) schedule. Product expiration dates are verified by Logistics and SPS Staff. Products exceeding the documented expiration date are removed from inventory following established procedures for reprocessing or return/disposal as outlined in the Logistics procedure manual.

c. Primary storage areas will hold bulk supplies awaiting distribution to secondary storage areas or examination room storage areas. The primary storage area will meet recommended engineering controls for clean/sterile storage, to include temperature 72-

78 degrees Fahrenheit, humidity control of 20-60%, and appropriate air exchange (>10). The primary storage area will store supplies until distribution or expiration.

d. Secondary storage areas (point of use) will hold supplies at par levels determined by Logistics and staff responsible for utilizing the supplies. The secondary storage area will meet recommended engineering controls for clean/sterile storage to include temperature 72-78 degrees Fahrenheit, humidity control 20-60%, and appropriate air exchange (>4) ("Interim Guidance"). The secondary storage area will store supplies until use, relocation to examination room storage or removal by Logistics staff based on par level, expiration and need.

e. Examination room storage areas (immediate use) will hold supplies specific for use in that patient examination room not to exceed a one week supply of an item as determined via collaboration of Logistics and staff responsible for utilizing the supplies. Supplies will follow the FIFO system for supply utilization. Supplies exceeding one week in the examination room will be assessed for integrity and compromise by the staff utilizing the examination room. Any supply suspected of compromise will be returned to Logistics.

f. Temperature and humidity will be monitored in primary and secondary storage areas using the TempTrak System. A combination of visual cues, alarms and electronic messaging will alert staff of a potential temperature or humidity concern. Staff will respond to TempTrak alerts appropriately as outlined in the Procedure section of this Medical Center Memorandum (MCM).

g. Minor failures in environmental control of temperature, humidity or air flow do not require immediate relocation of materials unless there is valid concern for compromise, the humidity level exceeds 60% for greater than 12 hours, there is security or structural damage to the storage room, or it becomes evident that water or air contamination exists. Corrective action will begin immediately and will not exceed three days.

h. A minor failure may convert to a major failure if it is determined corrective action could not be completed in 3 days, humidity exceeds 60% for greater than 12 hours, there is security or structural damage to the storage room or water or air contamination enters the room.

i. A major failure in environmental control of security, structure, temperature, humidity or airflow requires immediate relocation of sterile supplies to an alternate storage location. Critical and semi-critical reusable medical equipment (RME) will be reprocessed by SPS. Invasive sterile devices will be returned to Logistics for disposition. Non-invasive sterile products will be returned to Logistics for possible redistribution to low risk areas.

j. Newly constructed and renovated areas involving replacement of HVAC systems, which will meet recommended requirements, are to include temperature 72 +/- 1

degrees Fahrenheit, humidity control of 20-60%, and appropriate air exchange (>4) ("Interim Guidance").

k. Invasive sterile products stored in an area where humidity has exceeded 60% for greater than 12 hours will be removed and disposition will follow existing Logistic policy for return or disposal. Non-invasive sterile products returned to Logistics will be assessed for possible compromise based on visible signs of condensation, package tears, discoloration or other evidence of contamination. Products deemed compromised will be disposed of by Logistics following existing procedures. Products deemed viable will be redistributed to low risk areas.

l. An Infection Control Risk Assessment (ICRA) of primary and secondary storage areas in this medical center provides guidance on the potential risk of infection in the event engineering controls, temperature/humidity or proper air flow are compromised. Areas of highest risk include Logistics primary storage, Operating Room secondary storage including:

(1) Sterile Core rooms

(2) Primary Acute Care Unit rooms, and

(3) Endoscopy Procedure rooms, ICU secondary storage, ED secondary storage and secondary storage on 1-2A,1-3A, Specialty Clinic and Dental. Staff will respond to TempTrak alerts appropriately as outlined in the procedure section of this MCM.

4. **DEFINITIONS:**

a. Clean/Sterile Supplies: Any medical device or consumable designed for patient care that has been prepared by an authorized vendor or facility Sterile Processing Service (SPS) using aseptic or sterile technique. For the purpose of this MCM, "supplies" will refer to medical consumables and/or clean/sterile supplies.

b. Clean/Sterile Storage: Areas purposed to store clean/sterile supplies until use or expiration. (Attachment A).

c. Primary Storage Area: Areas purposed to hold bulk clean/sterile supplies awaiting distribution to Secondary Storage area (point of use) or Examination Storage Room (immediate use).

d. Secondary Storage Area: Areas purposed at point of use to hold clean/sterile supplies for a service or group of services. Supplies in this area are maintained at par levels established by the service utilizing the supply storage room in collaboration with Logistics.

e. Examination Room Storage Area (Immediate Use/Just in Time Use): Areas purposed within a patient examination room to hold clean/sterile supplies for immediate

use, not to exceed a week's worth of supplies. Examination Room Storage Areas are not monitored for temperature and humidity.

f. Par levels: The quantity of an item needed to meet the needs of a service over a defined time.

g. Temperature: An environmental measurement of hotness or coldness. Primary and Secondary Clean/Sterile storage areas will be maintained in a temperature range of 72–78 degrees Fahrenheit in accordance with the Under Secretary of Health of Operations and Management Memorandum dated January 26, 2011. Temperature will not be monitored in Examination Room Storage areas.

h. Humidity: an environmental measurement of the amount of water vapor in the air. Humidity in Primary and Secondary Clean/Sterile Storage will be maintained within a range of 20–60% humidity in accordance with the Under Secretary of Health of Operations and Management Memorandum dated January 26, 2011. Humidity will not be measured in examination room storage areas.

i. TempTrak: An automated temperature and humidity monitoring system designed to record real time temperature and humidity measurements with audio and visual alert of readings outside defined parameters.

j. Infection Control Risk Assessment (ICRA) for Clean/Sterile Storage: An assessment tool utilized by staff to evaluate the disposition of clean/sterile supplies when environmental storage conditions have been compromised. (Attachment B).

k. Minor Problem: Can be resolved immediately or within three days. Does not compromise the security or structure of the storage room. Is not due to humidity in excess of 60% for greater than 12 hours. Is not due to water or air contamination entering the storage room.

l. Major Problem: Cannot be resolved immediately and will exceed three days to correct. Compromises the security or structure of the room. Is due to humidity in excess of 60% for greater than 72 hours. Is due to temperature in excess of 78 degrees Fahrenheit greater than 72 hours. Is due to water or air contamination entering the storage room.

m. Alternate Storage Location: A place where sterile supplies can be safely maintained and secured until consumables are returned to their original storage location. Options for alternate storage locations include return to Logistics primary storage, an uncompromised secondary storage location in close proximity or an area such as a hallway or unused exam room. A hallway or unused exam room should be used only for a short duration, not to exceed eight hours. Supplies must be covered when stored in the hallway.

5. **PROCEDURES:**

a. **General:** The Lebanon VA Medical Center provides clean/sterile storage for medical supplies.

b. **Logistics:**

(1) has primary responsibility for the Clean/Sterile supply bulk storage maintained in the primary storage area and secondary storage areas. Supply inventory will be inspected upon receipt and placed into stock using FIFO supply rotation. Removal, reprocessing and destruction of supplies will follow existing Logistic policies and SPS procedures in all clean/sterile storage locations.

(2) collaborates with staff utilizing secondary clean/sterile storage rooms to establish and maintain par supply levels for the appropriate services.

(3) replenishes and rotates par level supplies.

(4) destroys/disposes of compromised supplies of using destruction procedures after a complete summary of all actions taken are accomplished in accordance with VA Handbook 7348 Utilization of Personal Property. RME items will be sent to the SPS for reprocessing.

c. **Staff Utilizing Secondary Clean/Sterile Storage or Examination Room Storage:**

(1) ensures no "other" stored items are placed in the clean/sterile supply locations without first consulting Logistics. "Other" refers to any item not identified by Logistics as a clean/sterile medical supply item.

(2) ensures no more than a one week supply is stored in the examination room for immediate use items. Clean/Sterile supplies will be physically separated from "dirty" supplies. Staff consults with Logistics or Infection Control Committee (ICC) to ensure examination room storage is appropriate.

(3) removes from use and return to Logistics any supplies stored in excess of 7 days.

d. **The TempTrak system** monitors temperature and humidity in primary and secondary clean/sterile storage areas. A combination of visual cues and alarms will alert staff to possible temperature/humidity failures. Monitoring devices will be placed on the storage rack where supplies are stored. A visual read unit will be adjacent to the TempTrak monitoring device.

(1) Engineering will ensure primary and secondary clean/sterile supply rooms are maintained at a temperature range of 72-78 degrees Fahrenheit, humidity of 20-60 percent and have adequate airflow. A quarterly report on the above parameters will be submitted to the ICC.

(2) TempTrak sensors are attached to storage racks. In addition to sensors, visual digital thermometers are in each room to provide an immediate visual aid in response to a TempTrak alarm. In the event of a TempTrak alarm, immediate corrective action will begin as described below. (Attachment C).

(3) **TempTrak Process**:

(a) TempTrak System Alerts of Temperature or Humidity Failure

(b) Determine Tour of Duty

1 Day Tour

a Alert is received by Logistics and Engineering

b Logistics/Engineering collaborate with unit staff to define problem

2 Off Tour

a Alert is monitored by NOD/AOD and/or police

b NOD/AOD and/or police collaborate with unit staff to define problem. If unit staff is not available police may inspect area for obvious compromise and correction (i.e. An open door)

c Collaborate with Logistics and Engineering to define problem

(c) Define Problem

1 Minor Problem (see definition)

a Correct problem

b Document findings and resolution

2 Major Problem (see definition)

a Immediately relocate Clean/Sterile Supplies to Alternate Storage Location and Brief Leadership

b If indicated activate the Emergency Operation Command (EOC) via the EverBridge System

c Consult with Infection Prevention to Implement Product Infection Control Risk Assessment (ICRA)

(1) ICRA – low risk

(a) Return supplies

(b) Document incident

(2) ICRA – high risk

(a) Replenish supplies

(b) Follow Logistics SOP for return and destruction

(c) Document incident

e. **Infection Control Risk Assessment (ICRA):**

(1) If clean/sterile supplies are exposed to temperature or humidity beyond the parameters for storage defined in this MCM, the ICRA will be utilized in addition to manufactures guidelines to evaluate product disposition.

(2) High Risk Locations include areas where Critical RME, Semi-Critical RME, Invasive Sterile Devices and/or Non-invasive sterile products for use on surgery or acute care patients are stored.

(3) Low Risk Locations include areas where Non-Invasive Sterile Devices are stored for use on non acute patients and areas with minimal Critical RME, Semi-Critical RME and Invasive Sterile Devices.

(4) When a Major Risk occurs staff will follow the ICRA to guide disposition of sterile supplies. (Attachment B).

f. **Clean/Sterile Room Designation:**

(1) Designated Clean/Sterile Supply Rooms will be identified with appropriate signage on exterior doorways. Doorways will be kept locked at all times to ensure limited access to clean/sterile supply rooms.

(2) In the event a new Clean/Sterile Supply Room is required, the storage area must meet approval from Engineering, Infection Control, Safety, and Logistics. (Attachment A).

6. **RESPONSIBILITIES**:

a. The **Medical Center Director**, or designee, is responsible to ensure resources are available for appropriate clean/sterile storage.

b. The **Associate Director** is responsible for supporting Logistics and Engineering to comply with this memorandum.

c. The **Associate Director of Patient Care Services** supports Nursing Staff and SPS comply with this memorandum.

d. The **Chief of Staff** provides consultative guidance to ensure safe medical supplies are provided for patient use.

e. The **Logistics Chief:**

(1) ensures staff compliance with this memorandum.

(2) collaborates with engineering and nursing staff to continually assess clean/sterile storage rooms.

(3) is responsible for procuring, storing, distributing and delivering medical supplies and following established procedures in the Logistics procedure manual.

(4) coordinates product relocation to alternate storage area in the event of a storage room failure.

(5) provides a quarterly report to the ICC to include environmental failures (temperature, humidity or air flow), timely responses of appropriate responsible persons to alarms, compromised products, near misses and corrective actions.

f. **Engineering:**

(1) maintains temperature and humidity control for clean/sterile primary and secondary storage rooms.

(2) via Heating, Ventilation and Air Conditioning (HVAC) mechanics, sets acceptable parameters with input care/service line and in accordance with this MCM and will make appropriate system repairs when necessary.

(3) provides a quarterly report on air flow for primary and secondary clean/sterile storage locations to the Infection Control Committee. The report will include number of air exchanges flow failures and corrective action.

(4) coordinates with TempTrak users to reset alarms upon repair.

g. **FITS (Facility Information Technology Services)** maintains the operating integrity of the TempTrak alert system.

h. **The Nurse Officer on Duty (NOD), Administrative Officer of the Day (AOD), Operator and Police:**

(1) responds to TempTrak alerts during non-administrative hours.

(2) investigates probable cause of the alert following procedures outlined in this memorandum

(3) activates the TempTrak Admin Group in the Everbridge System if indicated. The TempTrak Admin Group will include Engineering, Logistics and others as indicated.

i. **Service area staff** utilizing a Primary or Secondary Storage Room (not limited to Nursing):

(1) ensures doors to clean/sterile storage areas are closed and purposed for clean/sterile supply storage only.

(2) act as a first point of contact for visual inspection in the event of an environmental failure.

(3) coordinate with assigned Inventory Manager for permission to store other than par level consumables.

7. **REFERENCES:**

"Interim Guidance for Ventilation Requirements in Sterile Processing Service" Department of Veterans Affairs Memorandum from Deputy Under Secretary for Clinical Operations

8. **KEYWORDS:** TempTrak, Clean/Sterile Supply

9. **AUTHOR:** Chief, Logistics Services

10. **RECSCISSION:** None

11. **REISSUE DATE:** April 2015

Robert W. Callahan, Jr.
Director

Attachments: 3

MEDICAL CENER MEMORANDUM 134-002
June 19, 2012

Attachment A

	CLEAN/STERILE SUPPLY ROOM CHECKLIST	Engineering		Infection Control		Logistics		Safety	
		Initials	Date	Initials	Date	Initials	Date	Initials	Date
1	Room w have ability to be locked, control traffic and limit access								
2	Room will have TempTrak installed								
3	Room will have a thermostat to control room temperature								
4	Storage racks will be movable with a solid bottom shelf								
5	Windows will be kept locked and blinds will be closed at all times								
6	Visual aid thermometers will be attached to shelving units								
7	Corrugated boxes will be removed before supplies enter clean/sterile room								
8	Positive air flow								
9	Sign on exterior door will be posted as "Clean/Sterile Supply Room"								
10	Paperclips, staples, rubber bands, or tape are prohibited (except indicating tape)								
11	Storage will not block electrical access panels or sprinkler system								
12	Clean/Sterile Supply room will be kept clean and uncluttered								
13	No water supply in clean sterile supply rooms (except for fire suppression)								
14	Items will not be stored on floors								
15	Stored items are under the direction of Inventory Management, supplies obtained elsewhere should not be added without the approval of the Logistics Services Chief.								

Attachment B

INFECTION CONTROL RISK ASSESSMENT – Clean/Sterile Storage

Used for Major Events Only

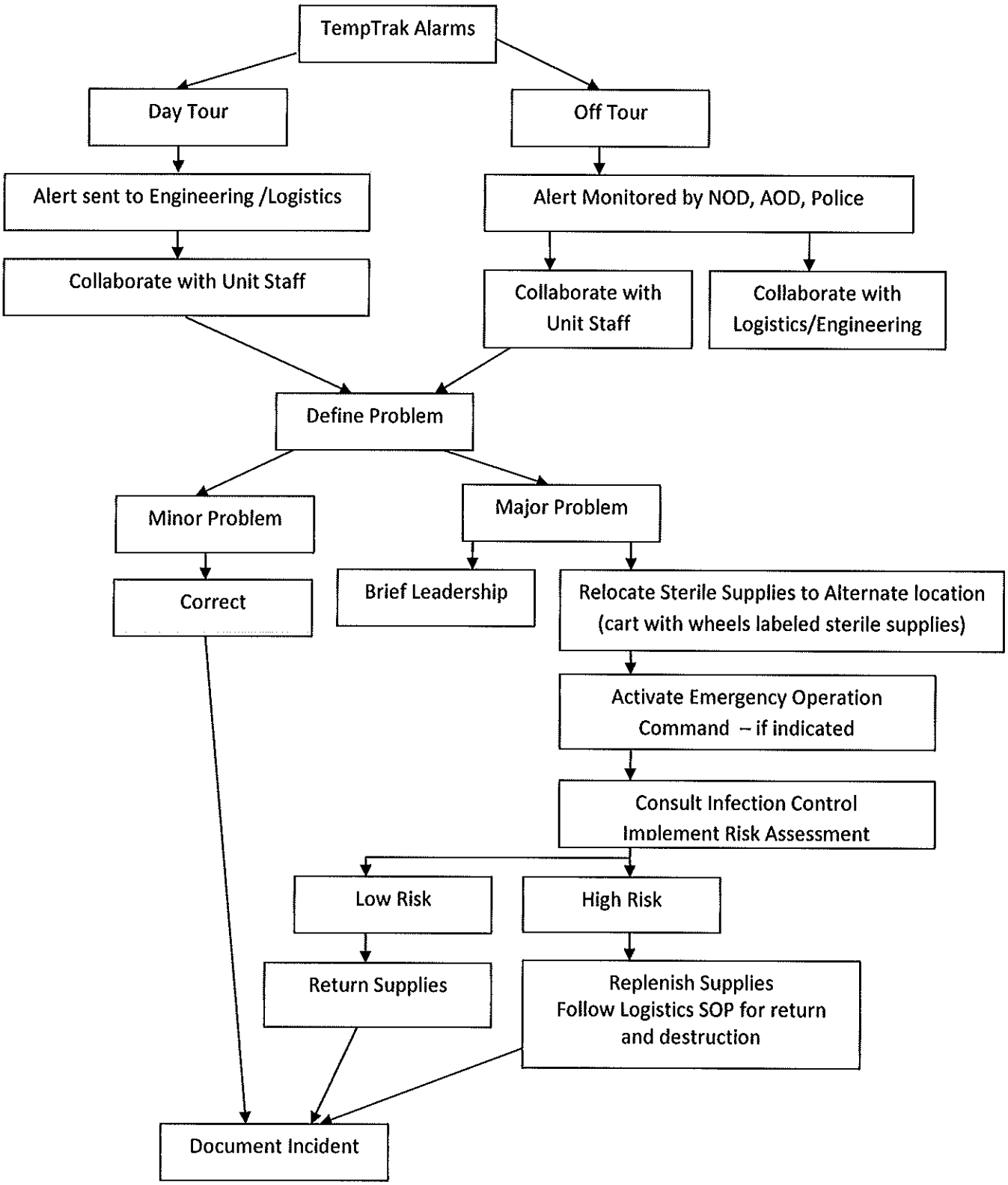
Clean/Sterile Storage Location	Probability of Causing Patient Harm 4 – High 3 – Moderate 2 – Low 1– None/NA	Risk/Impact Severity 4 – Catastrophic Major 3 – Moderate 2 – Minor 1 – None/NA	Current Storage Location 4 – None 3 – Poor 2 – Good/Fair 1 – Excellent/Solid	Risk/Impact Score = Probability + Risk + Current System	Comments
Operating Room Storage					
Sterile core rooms	4	4	3	11	High Risk, sterile, invasive items
PACU rooms	4	4	3	11	High Risk, sterile, invasive items
Endoscopy	3	3	3	9	Clean storage
Acute Care Storage					
ICU	4	4	1	9	
ED	4	4	2	10	
1-2A and 1-3A	3	3	3	9	
CLC Storage					
1-4B and 1-5AB	2	2	1	5	
Inventory Management Storage					
Bld 1 Room 51	4	4	3	11	High Risk, sterile, invasive items
Primary Care Storage					
Bld 17 floors 2, 3 and 5	2	2	3	7	
Specialty Clinic Storage					
Bld 17 floors 3 and 4	3	3	3	9	
Dental Clinic Storage					
Bld 17 - 5	3	3	1	7	

Minor Risk Corrective Action Completed within 3 days Humidity greater than 60% does not exceed 12 hours Security and or structure of room intact No water or air contamination in room ***Immediate Relocation of supplies is not indicated*** ***Minor Risk will convert to Major Risk if any component of this definition is breached. See grid below for Major Risk.**	
Major Risk - with a Risk Impact Score ≥ 9 Corrective Action cannot be completed within 3 days Humidity greater than 60% exceeds 12 hours Security and or structure of room are compromised Evidence of water or air contamination in room **On the ICRA, if the Risk Impact Score for the affected area is greater than 9, the following apply:** 1. Requires immediate corrective action 2. Relocate clean/sterile supplies to alternate storage location 3. Reprocess all Critical Sterile and Semi Critical RME through SPS 4. Return Invasive sterile products to Logistics for disposition 5. Return Non Invasive sterile products to Logistics for redistribution in low risk areas. If there is no visible sign of compromise. Visible signs of compromise include condensation, package tears, discoloration or other evidence of contamination. **Areas of High Risk Include: Inventory Management Sterile Storage, OR Sterile Core, PACU, Endoscopy, ICU, ED, 1-2A, 1-3A, Specialty Clinic and Dental**	**Major Risk - with a Risk Impact Score ≤ 9** Corrective Action cannot be completed within 3 days Humidity greater than 60% exceeds 12 hours Security and or structure of room are compromised Evidence of water or air contamination in room **On the ICRA, if the Risk Impact Score for the affected area is less than 9, the following apply:** 1. Requires immediate corrective action 2. Relocate clean/sterile supplies to alternate storage location 3. Return invasive sterile devices to Logistics for disposition 4. Any Critical (sterile) or Semi Critical RME should be reprocessed in SPS 5. Non Invasive Sterile products can be used if there is no visible sign of compromise. Visible signs of compromise include condensation, package tears, discoloration or other evidence of contamination **Areas of Low Risk Include: 1-4B, 1-5 and Primary Care**

MEDICAL CENER MEMORANDUM 134-002
June 19, 2012

Attachment C

TEMPTRAK FLOW PROCESS



HBP

Factory assembled, horizontal blow-thru ducted HBP fan coils are designed for concealed installations above ceilings with ducted return and discharge air and are suitable for projects such as hotels, motels, condominiums and general commercial applications.

STANDARD FEATURES INCLUDE

- Performance AHRI Certified to Standard 440.
- ETL-Listed. Constructed in compliance with ANSI/UL 1995 Standard.
- All casing sheet metal components fabricated of 18GA G90 galvanized steel.
- Return air plenum thermally and acoustically insulated covering the motor(s)/blower(s) assembly to reduce noise dissipation from the unit.
- High-efficiency 2-row coil suitable for a 2-pipe system.
- Coil manual air vent.
- 1-Inch thick disposable filter.
- Multi-speed motor of the permanent split capacitor (PSC) type.
- Double Width Double Inlet (DWDI) direct driven blowers of the whisper quite type.
- Controls installed in a single control box suitable for single power supply.
- Single wall condensate pan in galvanized steel, thermally protected on the outside. (Consult Titus for availability).
- 1-Inch discharge air flange.
- 1-Inch return air flange
- Anti-vibration mounts for field installation.

OPTIONAL FEATURES INCLUDE

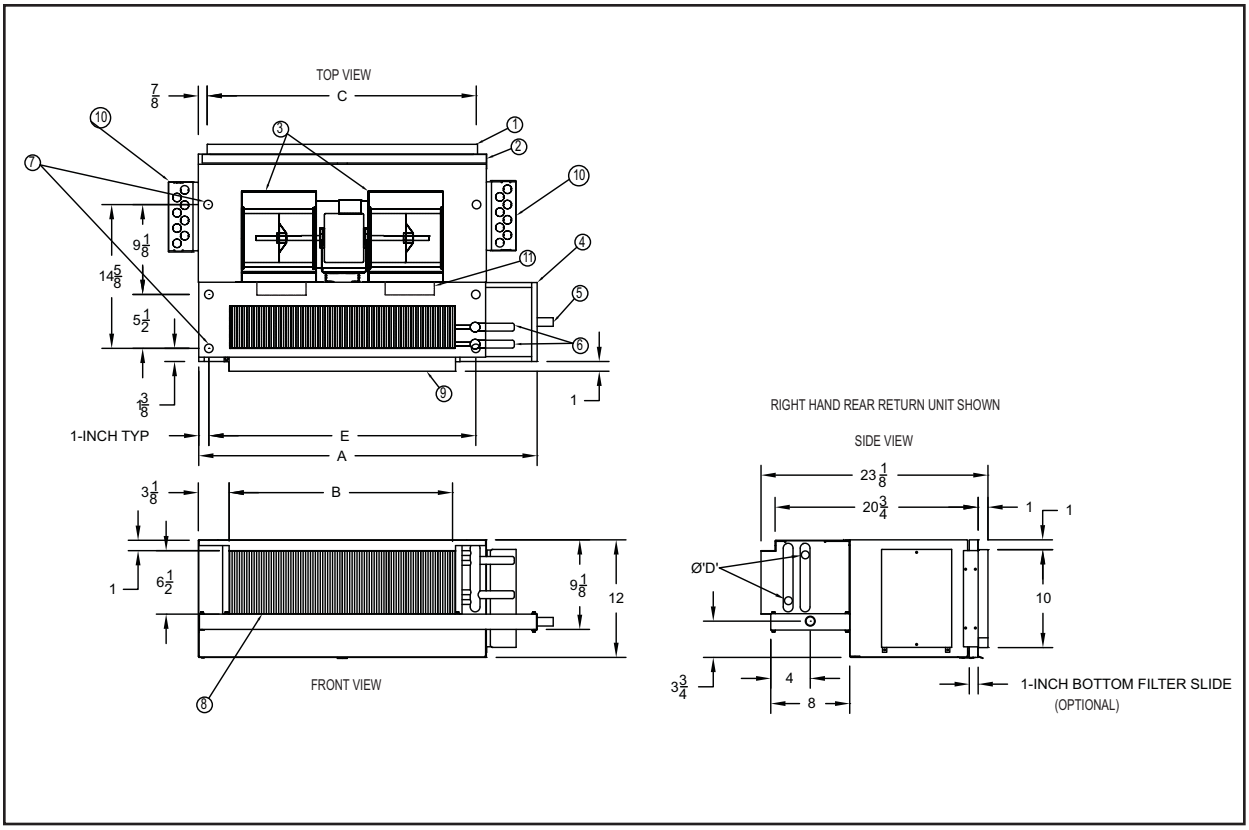
- 3-, 4- And 5-row coils for 2-pipe systems.
- Single block 2, 3 and 4 rows CW with 1 row re-heat or pre-heat coils for 4-pipe system applications (5 rows max).
- Single block 2 and 3 rows CW with 2 rows re-heat or pre-heat for 4-pipe system applications (5 rows max).
- Automatic coil air vents.
- LH or RH entry pipe connections.
- Filter option include:
  - ◇ 1-inch high-efficiency pleated filters.
  - ◇ 1-inch washable filters.
- Bottom or rear return air and filter location.
- Filter supports with slides or clips.
- Filter removal from LH/RH, bottom and rear.
- Cabinet liner in ½-inch foil face.
- Motor voltage suitable for 208V, 230V or 277V/1Ph/60Hz power supplies.
- Motor in-line quick disconnect (Not available on bottom return filter).
- Thermostat and Accessories (Refer to Accessories on page V86 for details).
- Single power supply disconnect switch and fuses.
- Automatic 2-pipe changeover switch for heating and cooling applications.
- Electric heaters.
- HW standby electric heater auto changeover switch.
- Valve Packages (Refer to Accessories on page V86 for details).
- Condensate pan options:
  - ◇ Single wall condensate pan manufactured in 20GA 304 Stainless Steel.
  - ◇ Double wall construction consisting of outer and inner skins.
  - ◇ Condensate pan overflow safety switch.
  - ◇ Condensate pan safety overflow connection.

AHRI CERTIFIED™ www.ahridirectory.org
Room Fan-Coils
AHRI Standard 440

ETL®

A Participating Corporation in the AHRI 440 Certification Program

HBP CONCEALED CEILING WITH PLENUM



1. Return Air Flange
2. Filter Rear Return
3. Motor/Blower(s) Assemby
4. Condensate Tray (Double Wall optional)
5. Condensate Copper Connection $^{3}/_{4}$" MNPT
6. Coil Connections (2-Pipe Shown)
7. Hanging Points
8. Coil
9. Supply Air Flange
10. Electric Control Panel - Note: Control box may mounted on either side.
11. Electric Heaters (optional)

Model	Dimensions (inches)						Approx. Weight (pounds)
	A	B	C	D	E	Filter	
HBP02	25½	14¼	18¼	⅝	18¼	20x12x1	63
HBP03	28½	17¼	21¼	⅝	21¼	23x12x1	70
HBP04	34½	23¼	27¼	⅝	27¼	29x12x1	80
HBP06	43½	32¼	36¼	⅝	36¼	38x12x1	99
HBP08	51½	40¼	44¼	⅝	44¼	46x12x1	106
HBP10	61½	50¼	54¼	⅞	54¼	56x12x1	136
HBP12	71½	60¼	64¼	⅞	64¼	66x12x1	150

All dimensions are in inches.

HBP CONCEALED CEILING WITH PLENUM

2-PIPE SYSTEM							
Model	2 Rows Cooling (1)				2 Rows Heating (1)		
	Total MBH	Sensible MBH	Flow gpm	PD ft wg	Sensible MBH	Flow gpm	PD ft wg
HBP02	4.1	3.3	0.8	0.34	13.2	0.9	0.32
HBP03	5.9	4.8	1.2	0.77	18.6	1.3	0.69
HBP04	8.7	7.0	1.7	1.84	26.9	1.8	1.56
HBP06	11.6	9.7	2.3	0.92	37.6	2.6	0.97
HBP08	15.0	11.9	3.0	1.66	45.9	3.1	1.58
HBP10	21.2	16.7	4.2	3.66	62.9	4.3	3.24
HBP12	24.1	19.4	4.8	2.50	74.3	5.1	2.54

4-PIPE SYSTEM							
Model	2 Rows Cooling				1 Row Heating		
	Total MBH	Sensible MBH	Flow gpm	PD ft wg	Sensible MBH	Flow gpm	PD ft wg
HBP02	3.9	3.2	0.8	0.31	7.5	0.5	0.40
HBP03	5.7	4.6	1.1	0.72	10.4	0.7	0.84
HBP04	8.4	6.7	1.7	1.72	14.9	1.0	1.89
HBP06	11.2	9.3	2.2	0.85	22.0	1.5	5.24
HBP08	14.3	11.3	2.9	1.52	25.8	1.8	1.22
HBP10	20.4	15.9	4.1	3.39	35.0	2.4	2.60
HBP12	23.0	18.4	4.6	2.28	42.3	2.9	4.22

2-PIPE SYSTEM							
Model	3 Rows Cooling				3 Rows Heating		
	Total MBH	Sensible MBH	Flow gpm	PD ft wg	Sensible MBH	Flow gpm	PD ft wg
HBP02	5.8	4.2	1.2	1.00	17.0	1.2	0.78
HBP03	8.4	6.1	1.7	2.25	24.2	1.6	1.70
HBP04	12.5	9.1	2.5	5.39	35.2	2.4	3.92
HBP06	16.8	12.6	3.4	2.44	49.5	3.4	2.12
HBP08	21.1	15.3	4.2	4.26	59.7	4.1	3.41
HBP10	27.5	20.6	5.5	3.67	80.7	5.5	3.36
HBP12	34.0	25.0	6.8	6.02	97.1	6.6	5.20

4-PIPE SYSTEM							
Model	3 Rows Cooling				1 Row Heating		
	Total MBH	Sensible MBH	Flow gpm	PD ft wg	Sensible MBH	Flow gpm	PD ft wg
HBP02	5.5	4.0	1.1	0.93	7.2	0.5	0.38
HBP03	8.0	5.8	1.6	2.07	10.0	0.7	0.80
HBP04	11.9	8.7	2.4	4.92	14.4	1.0	1.80
HBP06	16.0	11.9	3.2	2.22	21.1	1.4	4.94
HBP08	20.2	14.5	4.0	3.91	24.8	1.7	1.27
HBP10	26.2	19.5	5.2	3.34	33.7	2.3	2.60
HBP12	32.6	23.8	6.5	5.53	40.6	2.8	4.28

2-PIPE SYSTEM							
Model	4 Rows Cooling				4 Rows Heating		
	Total MBH	Sensible MBH	Flow gpm	PD ft wg	Sensible MBH	Flow gpm	PD ft wg
HBP02	6.9	4.8	1.4	1.88	18.7	1.3	1.26
HBP03	10.0	6.9	2.0	4.21	26.9	1.8	2.78
HBP04	13.1	9.6	2.6	1.52	38.5	2.6	1.31
HBP06	20.4	14.3	4.1	4.36	55.5	3.8	3.25
HBP08	23.5	16.6	4.7	2.88	65.5	4.5	2.40
HBP10	33.3	23.4	6.6	6.24	90.7	6.2	4.94
HBP12	39.0	27.6	7.8	5.82	100.8	7.4	4.96

4-PIPE SYSTEM							
Model	4 Rows Cooling				1 Row Heating		
	Total MBH	Sensible MBH	Flow gpm	PD ft wg	Sensible MBH	Flow gpm	PD ft wg
HBP02	6.6	4.5	1.3	1.70	6.9	0.5	0.36
HBP03	9.5	6.5	1.9	3.81	9.6	0.7	0.76
HBP04	12.3	9.0	2.5	1.35	13.7	0.9	1.68
HBP06	19.2	13.4	3.8	3.91	20.2	1.4	4.63
HBP08	22.2	15.6	4.4	2.58	23.7	1.6	1.25
HBP10	31.6	22.0	6.3	5.64	32.2	2.2	2.63
HBP12	37.0	26.0	7.4	5.23	38.9	2.7	4.19

2-PIPE SYSTEM							
Model	5 Rows Cooling				5 Rows Heating		
	Total MBH	Sensible MBH	Flow gpm	PD ft wg	Sensible MBH	Flow gpm	PD ft wg
HBP02	7.6	5.0	1.5	2.77	19.2	1.3	1.65
HBP03	9.8	6.8	2.0	0.93	27.1	1.9	0.72
HBP04	14.7	10.2	2.9	2.23	40.4	2.8	1.68
HBP06	22.4	15.0	4.5	6.20	57.7	3.9	4.13
HBP08	26.0	17.5	5.2	4.00	68.0	4.6	2.93
HBP10	35.2	24.0	7.0	4.91	93.7	6.4	3.93
HBP12	43.2	29.2	8.6	7.86	112.4	7.7	5.99

1. Standard basic unit.
2. All ratings are based at sea level altitude, nominal air volumes at 0 external static pressure and with water as the cooling fluid.
3. Cooling capacities are based on 80°F DB/67°F WB entering air, 45°F entering water, 10°F water temperature rise and high fan speed.
4. Heating capacities are based on 70°F DB entering air temperature, 180°F entering hot water, 30°F water temperature drop and high fan speed.

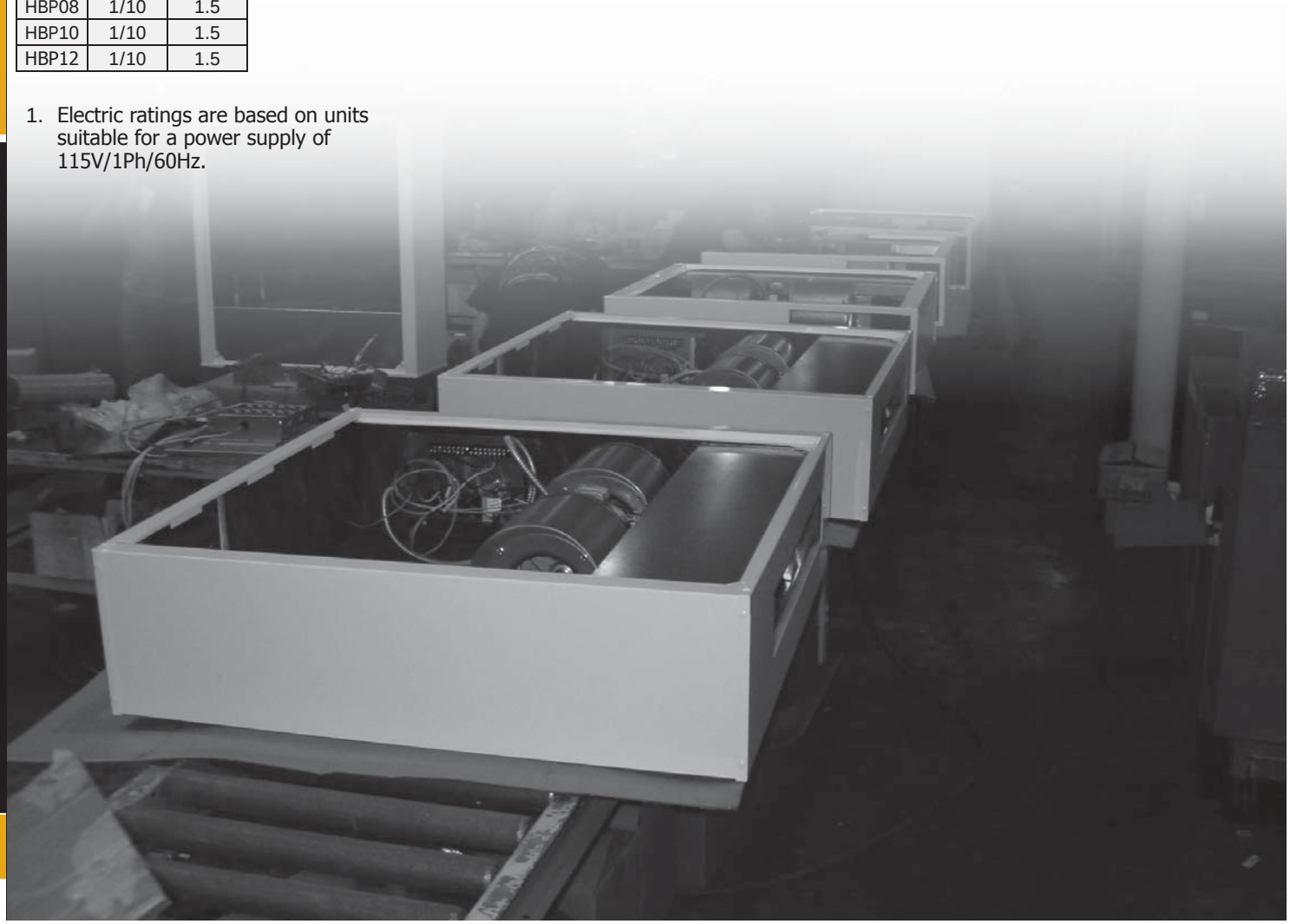
Nominal Air Volumes			
Model	cfm (1)		
	High	Med	Low
HBP02	219	187	171
HBP03	326	289	230
HBP04	503	391	310
HBP06	696	567	439
HBP08	813	647	535
HBP10	1150	867	696
HBP12	1370	931	781

Air Volume (cfm) Vs External Static Pressure in wg (2)						
Model	0.05	0.10	0.15	0.20	0.25	0.30
HBP02	198	182	166	-	-	-
HBP03	289	262	219	150	-	-
HBP04	478	441	399	341	245	-
HBP06	651	613	569	504	401	-
HBP08	777	722	681	658	628	536
HBP10	1075	1012	939	848	737	616
HBP12	1297	1236	1171	1095	1015	947

1. Nominal air volume ratings are based on a 2-row coil at sea level altitude with 0 external static pressure.
2. Air volumes at alternative external static pressures are based at high fan speed.

Model	Motor	
	HP	Total AMPS
HBP02	1/20	0.8
HBP03	1/20	0.8
HBP04	1/20	0.8
HBP06	1/10	1.5
HBP08	1/10	1.5
HBP10	1/10	1.5
HBP12	1/10	1.5

1. Electric ratings are based on units suitable for a power supply of 115V/1Ph/60Hz.



MITSUBISHI ELECTRIC

COOLING & HEATING

Mr.SLIM®

Split-ductless A/C and Heat Pumps

SUBMITTAL DATA: PKA-A24KA4 & PUY-A24NHA4 . . . . . 24,000 BTU/H WALL-MOUNTED AIR-CONDITIONING SYSTEM

Job Name:	Location:	Date:
Purchaser:	Engineer:	
Submitted to:	For ☐Reference ☐Approval ☐Construction	
System Designation:	Schedule No.:	

GENERAL FEATURES

- Wall-mounted indoor unit for residential and commercial applications
- Shiny-white–exterior plastic; compact design
- Quiet operation—both indoor and outdoor units
- Self-check function—integrated diagnostics
- Limited warranty: five years on parts and defects and seven years on compressors

OPTIONAL ACCESSORIES

Indoor Unit

- ☐ Mini Condensate Pump (SI3100-230, 230V)
- ☐ L-Connector Pipe (PAC-SC84PI; for left side unit piping installation)

Outdoor Unit

- ☐ Drain Pan (PAC-SG63DP)
- ☐ Drain Socket (PAC-SG61DS)
- ☐ Three-pole Disconnect Switch (TAZ-MS303)
- ☐ Wind Baffle (WB-PA2)
- ☐ Air Outlet Guide (PAC-SG59SG)
- ☐ Mounting Base (DSD-400N)
- ☐ Mounting Pad (ULTRILITE2)
- ☐ Wall-mounting Brackets (CWMB1)

Controller Options

- ☐ Wireless Remote Controller Kit (MHK1) with Remote Controller (MRCH1), Wireless Receiver (MIFH1), and cable (MRC1)*
- ☐ Setback down to 50°F when used with MRCH1 Remote Controller
- ☐ Portable Controller (MCCH1; for use with Wireless Remote Controller Kit MHK1)*
- ☐ Outdoor Air Sensor (MOS1; for use with Remote Controller (MRCH1), Wireless Remote Controller Kit (MHK1) and Portable Controller (MCCH1)*

*See Submittal for information on each option.

- ☐ Wall-mounted Wired Remote Controller (PAR-21MAA)
- ☐ M-NET Adapter (PAC-SF81MA)
- ☐ CN51 Connector for Multiple Remote Controller Adapters/Duct Fan Controller (PAC-725AD)
- ☐ CN32 Connector for Remote On/Off (PAC-715AD)
- ☐ Remote Temperature Sensor (PAC-SE41TS)
- ☐ Remote Operation Adapter - Display and On/Off (PAC-SF40RM)
- ☐ Hand-held Wireless Remote Controller (PAR-FL32MA)
- ☐ Lockdown Bracket for Hand-held Controller (RCMKP1CB)
- ☐ Control/Service Tool (PAC-SK52ST)

Cooling*

Rated Capacity . . . . . 24,000 Btu/h
Minimum Capacity . . . . . 12,000 Btu/h
SEER . . . . . 17.0 Btu/h/W
EER . . . . . 10.6 Btu/h/W
Total Input . . . . . 2,270 W

* Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB / 67°F (19°C) WB. Outdoor: 95°F (35°C) DB / 75°F (24°C) WB.

Electrical Requirements

Power Supply . . . . . 208 / 230V, 1-Phase, 60 Hz
Recommended Fuse/Breaker Size . . . . . 25 A

Voltage

Indoor - Outdoor S1-S2 . . . . . AC 208 / 230V
Indoor - Outdoor S2-S3 . . . . . DC 24V

OPERATING CONDITIONS

		Indoor Intake Air Temp.	Outdoor Intake Air Temp.
Cooling	Maximum	95°F (35°C) DB, 71°F (22°C) WB	115°F (46°C) DB
	Minimum	67°F (19°C) DB, 57°F (14°C) WB	0°F** (-18°C) DB

** With optional wind baffle accessory installed. If not installed, the minimum temperature will be 23°F (-5°C) DB.

Indoor Unit: PKA-A24KA4

Outdoor Unit: PUY-A24NHA4

Indoor Unit

MCA . . . . . 1 A
Fan Motor . . . . . 0.36 F.L.A.
Fan Motor Output . . . . . 56 W
Airflow (Lo - Mid - Hi) . . . . . 635 - 705 - 775 Dry CFM
570 - 635 - 700 Wet CFM
Air Filter . . . . . Polypropylene Honeycomb
Sound Pressure Level (Lo - Mid - Hi) . . . . . 39 - 42 - 45 dB(A)
SHF 0.77
Moisture Removal . . . . . 5.0 pt./h

DIMENSIONS	UNIT INCHES / MM
W	46-1/16 / 1,170
D	11-5/8 / 295
H	14-3/8 / 365

Weight . . . . . 46 lbs. / 21 kg
External Finish . . . . . Munsell No. 1.0Y 9.2 / 0.2
Field Drainpipe Size O.D . . . . . 5/8" / 16 mm

Outdoor Unit

Compressor . . . . . DC Inverter-driven Twin Rotary
MCA . . . . . 18 A
MOCP . . . . . 30 A
Fan Motor . . . . . 0.75 F.L.A.
Sound Pressure Level
Cooling . . . . . 48 dB(A)

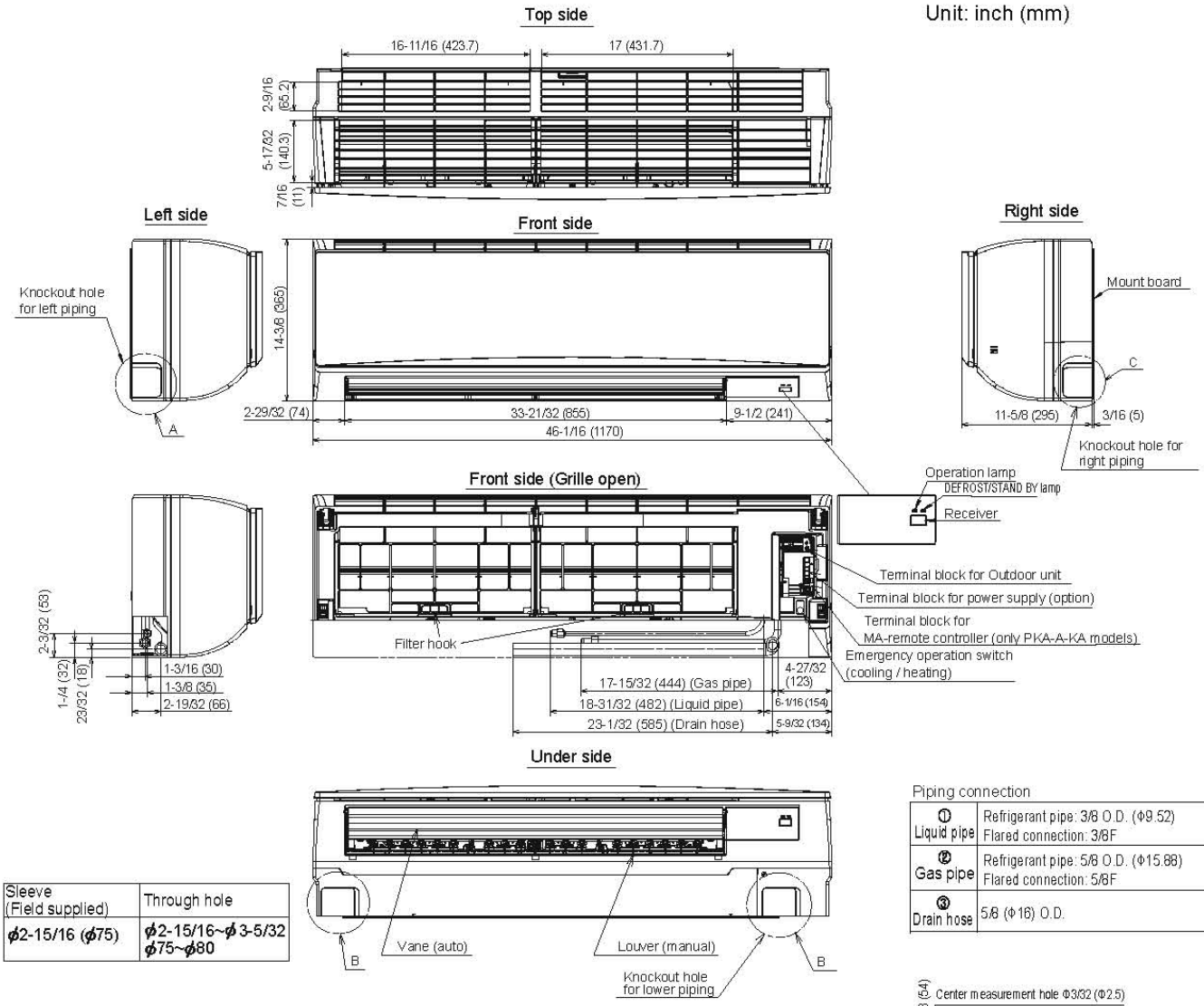
DIMENSIONS	INCHES / MM
W	37-3/8 / 950
D	13 + 1-3/16 / 330 + 30
H	37-1/8 / 943

Weight . . . . . 163 lbs. / 74 kg
External Finish . . . . . Munsell No. 3Y 7.8 / 1.1
Refrigerant Type R410A
Refrigerant Pipe Size O.D.
Gas Side . . . . . 5/8" / 15.88 mm
Liquid Side . . . . . 3/8" / 9.52 mm
Max. Refrigerant Pipe Length . . . . . 165' / 50 m
Max. Refrigerant Pipe Height Difference . . . . . 100' / 30 m
Connection Method . . . . . Flared

R410A INVERTER

DIMENSIONS: PKA-A24KA4

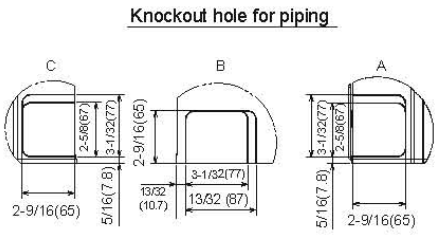
Unit: inch (mm)

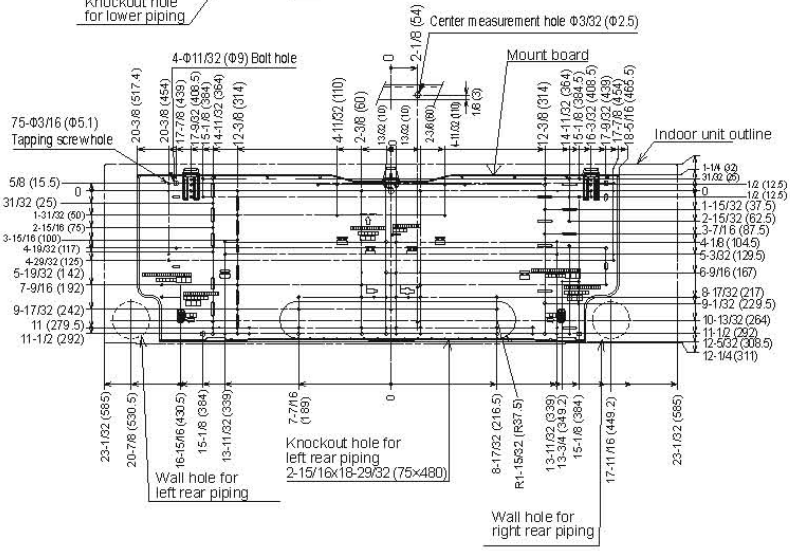


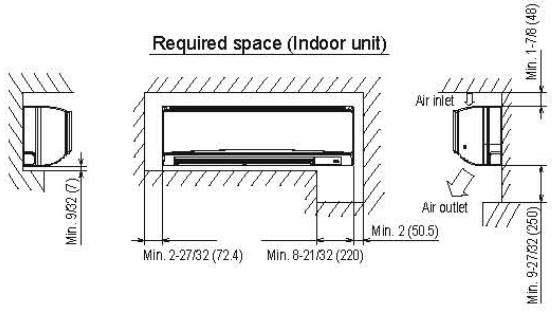
Sleeve (Field supplied)	Through hole
ϕ2-15/16 (ϕ75)	ϕ2-15/16~ϕ3-5/32 ϕ75~ϕ80

Piping connection

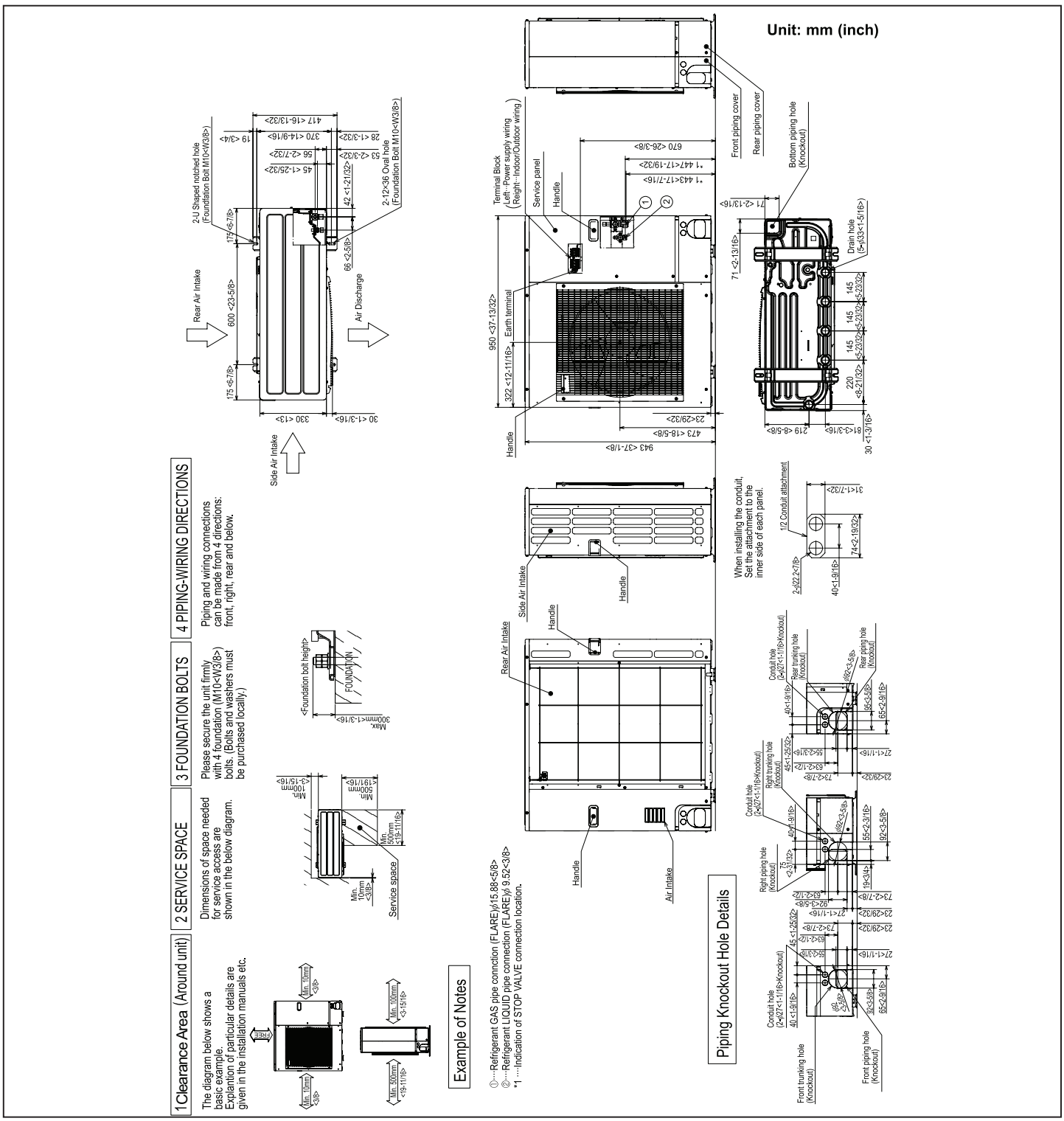
① Liquid pipe	Refrigerant pipe: 3/8 O.D. (Φ9.52) Flared connection: 3/8F
② Gas pipe	Refrigerant pipe: 5/8 O.D. (Φ15.88) Flared connection: 5/8F
③ Drain hose	5/8 (Φ16) O.D.







DIMENSIONS: PUY-A24NHA4



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www.mehvac.com

Specifications are subject to change without notice.

FORM# PKA-A24KA4 - PUY-A24NHA4 - 201111

CITY MULTI® Model: PKFY-P18NHMU-E

MITSUBISHI ELECTRIC

Job Name: Location:

Drawing Reference: Schedule No.

System No.: Date:

GENERAL FEATURES

- R410A refrigerant
- Seven sizes from 6,000 to 30,000 Btu/h
- Powerful airflow (CFM)
- Compact, lightweight, shiny-white, flat-panel design
- Quiet operation
- Multiple fan-speed settings
- Intake grille filter is easily removed for cleaning
- Built-in receiver is standard

SPECIFICATIONS

Capacity*
Cooling……..18,000 Btu/h
Heating……..20,000 Btu/h

Power
Power Source…….....208 / 230V, 1-phase, 60Hz
Power Consumption
Cooling……0.03 kW
Heating……0.03 kW
Current
Cooling…….....……0.30 A
Heating…….....……0.30 A
Minimum Circuit Ampacity (MCA)……..……...0.38 A
Maximum Overcurrent Protection (MOCP) Fuse..…..…..15 A

External Finish……..…….Munsell No. 1.0Y 9.2 / 0.2

External Dimensions
Inches……..11-5/8 H x 35-3/8 W x 9-13/16 D
mm……295 H x 898 W x 249 D

Net Weight
Unit……..…….....29 lbs. / 13 kg

Coil Type…….....….Cross Fin
(Aluminum Plate Fin and Copper Tube)

Fan
Type x Quantity……..……...Line Flow Fan x 1
Airflow Rate (Low-Mid-High)..……..……...320 - 370 - 425 CFM
Motor
Type……..……..……..……..Direct-drive DC Motor
Output……..……..……..……..……..0.030 kW

Air Filter..……Polypropylene Honeycomb

Refrigerant Piping Dimensions
Liquid (High Pressure)…….....…1/4" / 6.35 mm (Flare)
Gas (Low Pressure)…….……..…1/2" / 12.7 mm (Flare)

Drainpipe Dimension…….....……..……I.D. 5/8" / 16 mm

Sound Pressure Levels
Low-Mid-High…..……..……..36 - 41 - 45 dB(A)

OPTIONS

- ☐ Condensate Pump……SI3100-230
- ☐ External Heat Adapter……..…..PAC-725AD
- ☐ CN24 Relay Kit……CN24RELAY-KIT-CM

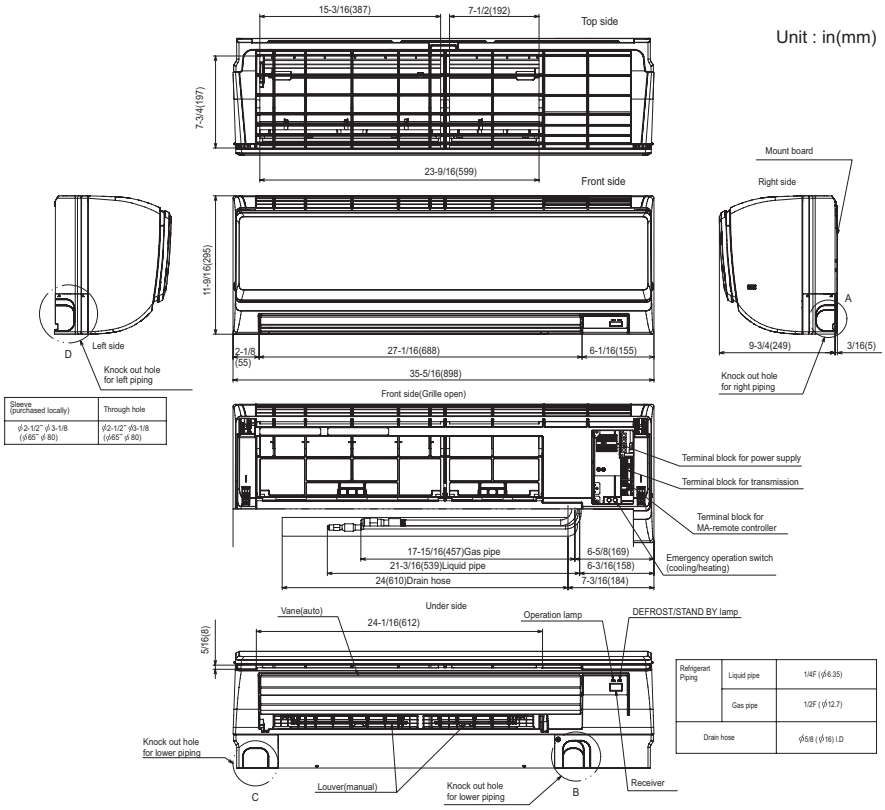
* Cooling / Heating capacity indicated at the maximum value at operation under the following conditions:
Cooling: Indoor 80°F (27°C) DB / 67°F (19°C) WB, Outdoor 95°F (35°C) DB
Heating: Indoor 70°F (21°C) DB, Outdoor 47°F (8°C) DB / 43°F (6°C) WB

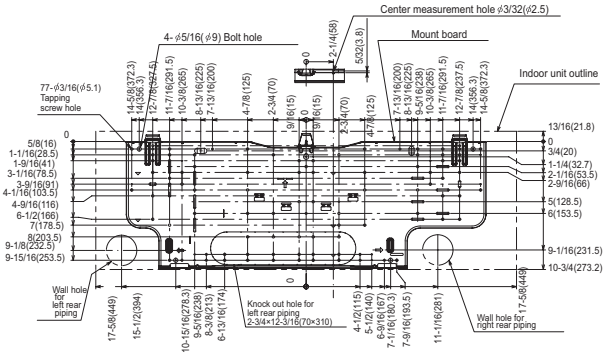
Note: Ventilation air: Providing sufficient ventilation air is an important part of every building design. ASHRAE Standard 62 provides the minimum ventilation air requirement. Also, check local codes.

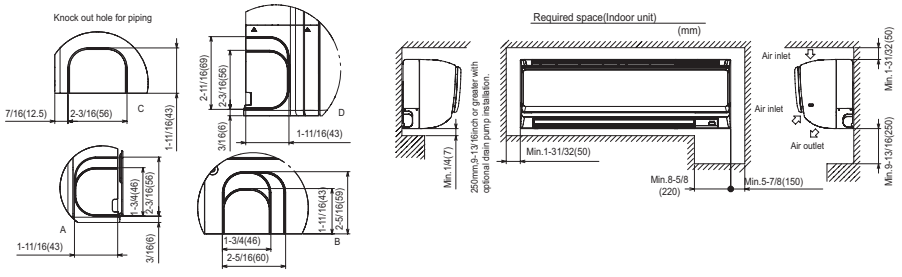
R410A

Model: PKFY-P18NHMU-E – DIMENSIONS

Unit : in(mm)







Mitsubishi Electric Air Conditioning & Refrigeration Systems Works acquired ISO 9001 certification under Series 9000 of the International Standard Organization (ISO) based on a review of quality warranties for the production of refrigeration and air conditioning equipment.

ISO Authorization System
The ISO 9000 series is a plant authorization system relating to quality warranties as stipulated by the ISO. ISO 9001 certifies quality warranties based on the "design, development, production, installation and auxiliary services" for products built at an authorized plant.

Certificate Number FM33568

Mitsubishi Electric Air Conditioning & Refrigeration Systems Works acquired environmental management system standard ISO 14001 certification.

The ISO 14000 series is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

Certificate Number EC97J1227

HVAC Advanced Products Division
Mitsubishi Electric & Electronics USA, Inc.
3400 Lawrenceville Suwanee Rd.
Suwanee, GA 30024
Tele: 678-376-2900 • Fax: 800-889-9904
Toll Free: 800-433-4822 (#4)
www.mehvac.com

Specifications are subject to change without notice.

CITY MULTI® Model: PUMY-P36NHMU MITSUBISHI ELECTRIC

Job Name: Location:

Drawing Reference: Schedule No.

System No.: Date:

OUTDOOR VRF SYSTEM FEATURES

- Single-phase outdoor unit with variable refrigerant flow zoning (VRF) technology
- Inverter-driven (variable speed) compressor
- Total refrigerant piping length of 394' (120 m)
- Uses CITY MULTI indoor units and Controls Network
- External finish: Precoated Galvanized-steel Sheets
- Operating Outdoor Temperature Range
  Cooling: 23°F ~ 115°F (-5° ~ +46°C) DB*
  Heating: 0°F ~ +60°F (-18° ~ +15°C) WB

* If PKFY-P06/08 indoor units are connected, then range is 50°F ~ 115°F (10°C ~ 46°C).

INVERTER

R410A

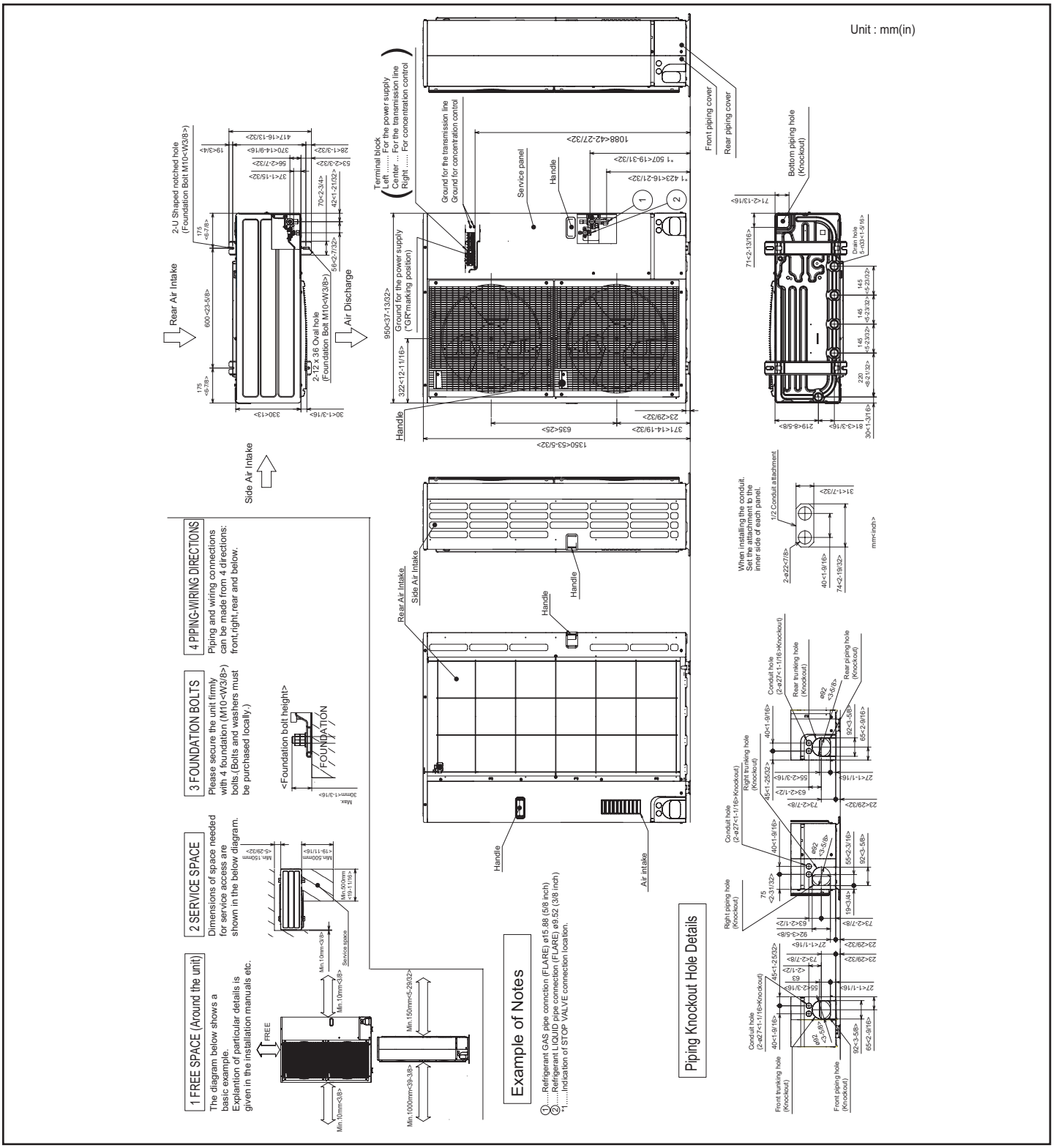
OPTIONAL PARTS

- ☐ Branch Joint (T-Branch)……..…...CMY-Y62-G-E
- ☐ Header - Four-Branch……..CMY-Y64-G-E
- ☐ Header - Eight-Branch……..CMY-Y68-G-E
- ☐ Air Outlet Guide (One Piece)**……..PAC-SG59SG-E
- ☐ Wind Baffle (One Piece)**……WB-PA2
- ☐ Drain Pan……..…..PAC-SG64DP-E
- ☐ Drain Socket……..…..PAC-SG61DS-E

** PUMY requires two outlet guides or wind baffles for installation.

Specifications		Model Name
Unit Type		PUMY-P36NHMU
Nominal Cooling Capacity	Btu/h	36,000
Nominal Heating Capacity	Btu/h	40,000
External Dimensions (H x W x D)	In. / mm	53-3/16 x 37-7/16 x 13 (+1-3/16) / 1,350 h x 950 w x 330 (+30)
Net Weight	Lbs. / kg	287 / 130
Electrical Power Requirements	Voltage, Phase, Hertz	208 / 230V, 1-phase, 60Hz
Cooling Power Input	kW	3.22
Heating Power Input	kW	2.93
Cooling Current (208/230V)	A	14.2 / 15.7
Heating Current (208/230V)	A	12.9 / 14.2
Minimum Circuit Ampacity (MCA)	A	26
Recommended Fuse/Breaker Size	A	30
Maximum Fuse Size	A	40
Piping Diameter (Brazed) (In. / mm)	Liquid (High Pressure)	3/8 / 9.52
	Gas (Low Pressure)	5/8 / 15.88
Indoor Unit	Total Capacity	50 to 130% of Outdoor Unit Capacity
	Model / Quantity	P06 to P36 / 1 to 6
Sound Pressure Levels	dB(A)	49/51
Fan		
Type x Quantity		Propeller Fan x 2
Airflow Rate	CFM	3,530
Direct-drive Inverter Motor Output	kW	0.086
Compressor Operating Range		33% to 100%
Compressor Type x Quantity		Inverter-driven Scroll Hermetic x 1
Compressor Motor Output	kW	2.4
Refrigerant		R410A
Lubricant		FV50S
High-pressure Protection Device		601 psi / 4.15 MPa
Compressor / Fan Protection Device		Overheat Protection / Thermal Switch
Inverter Protection Device		Overheat / Overcurrent Protection
Blue Fin Anti-corrosion Protection: Cellulose- and polyurethane-resin coating treatment applied to condenser coil that protects it from air contaminants; ≥1µm thick; Salt Spray Test Method - no unusual rust development to 240 hours.		

Model: PUMY-P36NHMU – DIMENSIONS



Certificate Number FM33568

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Your guide to selecting and specifying Nortec Steam Exchange Humidifiers!

SE Series

Engineering Manual

Includes technical specifications, guidelines, and options for selection and application of SETC B+ / SEP Steam Exchange humidifiers

2553855-B | 28 APR 2011

Nortec®
www.humidity.com

5. SHORT ABSORPTION MANIFOLD (SAM-e)

A. GENERAL

(1) NORTEC's best performing steam absorption system for use in Air Handling Units and duct systems where short steam absorption distance is critical.

(2) The SAM-e, Figure 17, distributes clean steam, precisely controlled, uniformly into the entire air stream, void of any condensate spray. Steam distribution takes place via distributor tubes with integrated nozzles. The steam is kept dry as condensate is drained through the main header.

(3) The stainless steel distribution tubes are typically mounted vertically but can also be mounted horizontally (10° slope) for vertical airflow applications. The distribution tubes come equipped with evenly spaced stainless steel nozzles providing optimum steam distribution, over the entire length of the tube.

(4) The nozzles extend into the center of the distribution tube ensuring only condensate free steam is released. (See Figure 18.) Condensate drains out of the distribution tubes, through the header, eliminating the need for jacketed tubes. A permanent bond between the nozzle and distribution tube is made when the nozzle is pressed into the tube. The nozzles and tubes have the same thermal expansion characteristics guaranteeing a permanent union. The specifically sized orifices ensure consistent output from each nozzle.

Figure 17. SAM-e Tubes

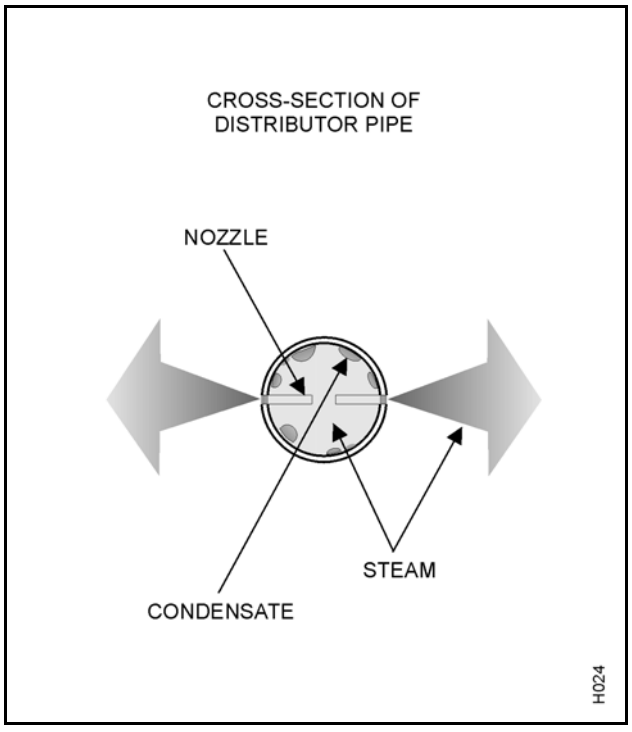


Figure 18. Cross-Section of Distributor Pipe

Tag	NORTEC Model	Load	Power Circuit	Stm. Press.	Max. Fuse	Quantity
19-SH-1	SETC 050, 110-120V	11.72 lbs/hr	110-120/1/60	15.00 psi	15.00 A	1
	Distribution Method				**Absorption Distance**	
	In Duct mini Short Absorption Manifold (see option schedule)				0.32 ft	

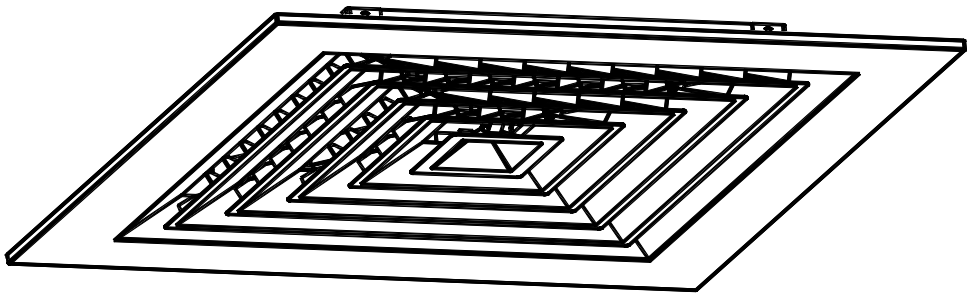
Tag	NORTEC Model	Load	Power Circuit	Stm. Press.	Max. Fuse	Quantity
19-SH-2	SETC 050, 110-120V	11.72 lbs/hr	110-120/1/60	15.00 psi	15.00 A	1
	Distribution Method				**Absorption Distance**	
	In Duct mini Short Absorption Manifold (see option schedule)				0.20 ft	

Tag	NORTEC Option	Part Number	Quantity
19-SH-1	Header Insulation, mini SAM-e 18"-6 Centers	2539633	1
	Tube Insulation, mini SAM-e 11" (Covers 1 Tube)	2538869	3
	Water Filter Cartridge 5 micron (x2)	1329506	1
	In-Line Water filter c/w 5 micron filter	1329505	1
	Switch Air Proving (duct airflow safety interlock)	1329203	1
	0-10V Dig. Duct Humidistat pkg	2520266	1
	0 - 10 Vdc single channel DEMAND signal acceptance	2523066	1
	Nortec LINKS XPS for SETC 050, BACnet/MSTP	2559031	1
	Inlet adapter, mini SAM-e, 1-3/4" OD	1509837	1
	Header mini SAM-e 18", 6" centers	1509832	1
	Steam Tube, mini SAM-e, 11 in Type MB	1509798	3

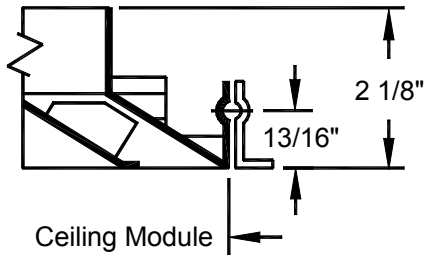
Tag	NORTEC Option	Part Number	Quantity
19-SH-2	Water Filter Cartridge 5 micron (x2)	1329506	1
	In-Line Water filter c/w 5 micron filter	1329505	1
	Switch Air Proving (duct airflow safety interlock)	1329203	1
	0 - 10 Vdc single channel DEMAND signal acceptance	2523066	1
	0-10V Dig. Duct Humidistat pkg	2520266	1
	Header Insulation, mini SAM-e 12"-3 Centers	2538932	1
	Tube Insulation, mini SAM-e 13" (Covers 1 Tube)	2538870	3
	Nortec LINKS XPS for SETC 050, BACnet/MSTP	2559031	1
	Inlet adapter, mini SAM-e, 1-3/4" OD	1509837	1
	Header mini SAM-e 12", 3" centers	1509811	1
	Steam Tube, mini SAM-e, 13 in Type MB	1509799	3

Square and Rectangular Ceiling Diffusers
Steel • Louvered Face • Induction Vanes

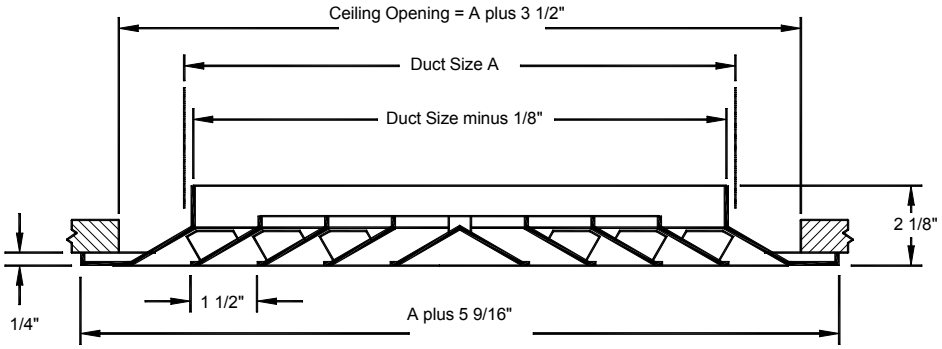
Model: TDV • **Square, Rectangle or Round Neck**



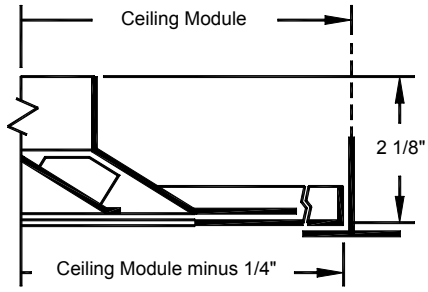
☐ **Border Type 2 (Snap-In)**



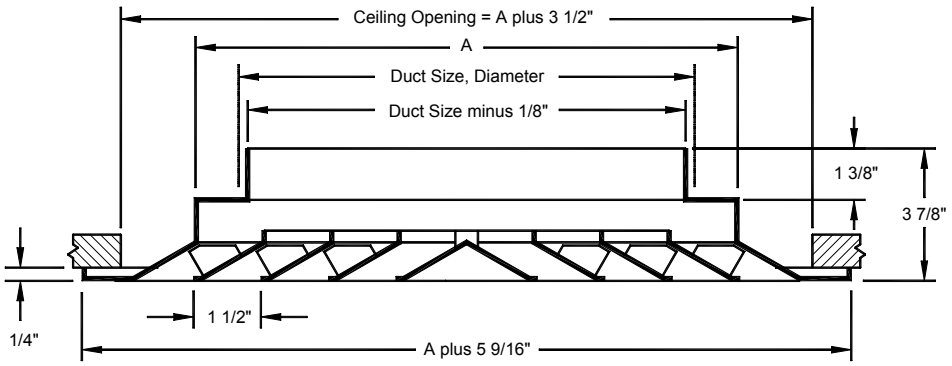
☐ **Border Type 1 (Surface Mount) Square or Rectangular Neck**



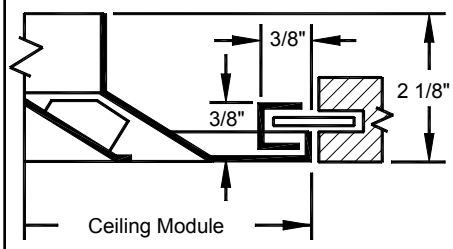
☐ **Border Type 3 (Lay-In)**



☐ **Border Type 1 (Surface Mount) Round Neck**



☐ **Border Type 4 (Spline)**



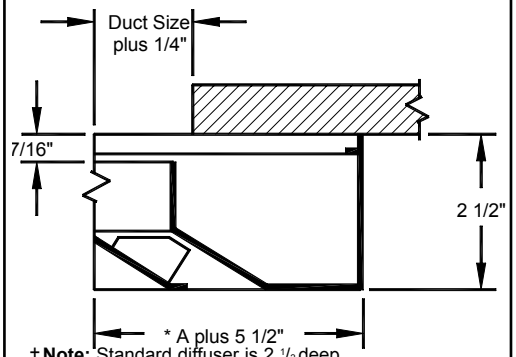
Dimensions are in inches.

For Dimensions "A" see table on next page.

(Please see reverse side).

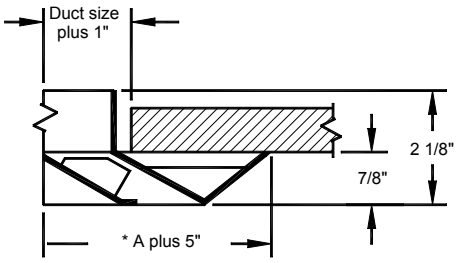
Border Types, Dimensions (Continued)

☐ **Border Type 5 (Dropped Face)**



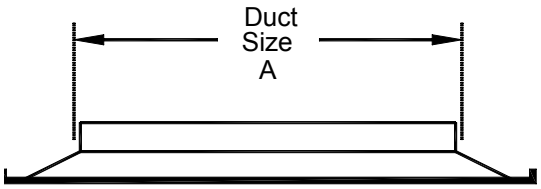
† **Note:** Standard diffuser is 2 ½ deep.
Optional 4" deep diffuser is available.

☐ **Border Type 6 (Beveled Drop Face)**



***Note:** Dimension A refers to either square/rectangle or round neck diffusers. See drawings below.

Available Duct Sizes, Square and Rectangular Necks

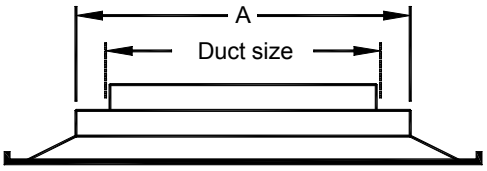


Border Type 1, 5, 6	
Minimum Duct Size A	**Maximum Duct Size A**
6 x 6	48 x 48

Border Type 2, 3, 4		
Available Module Size	**Minimum Duct Size A**	**Maximum Duct Size A**
12 x 12	6 x 6	9 x 9
24 x 24	6 x 6	18 x 18
48 x 24	12 x 12	42 x 18

Note: Duct sizes are available in 3" increments only.
Maximum duct size for border 5 is 36 x 36.

Available Duct Sizes, Round Necks



Border Type 1, 5, 6	
Dimensions A	**Available Round Duct Size**
6 x 6	6
9 x 9	6, 8
12 x 12	8, 10, 12
15 x 15	6, 8, 10, 12, 14
18 x 18	6, 8, 10, 12, 14, 16

Border Type 2,3,4		
Available Module Size	**Minimum A**	**Available Round Duct Size**
12 x 12	6 x 6	6
	9 x 9	6, 8
24 x 24	6 x 6	6
	9 x 9	6, 8
	12 x 12	6, 8, 10, 12
	15 x 15	6, 8, 10, 12, 14
	18 x 18	6, 8, 10, 12 14, 16

***Note:** Round duct sizes are available only in sizes shown.

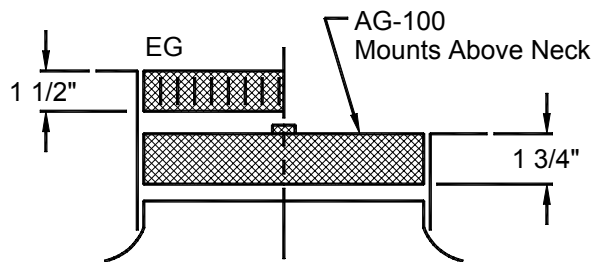
† **See Page 3**

Accessories (Optional) for Round Neck

Check ☐ if provided

☐ **Model AG-100 Radial Sliding Blade Damper ***

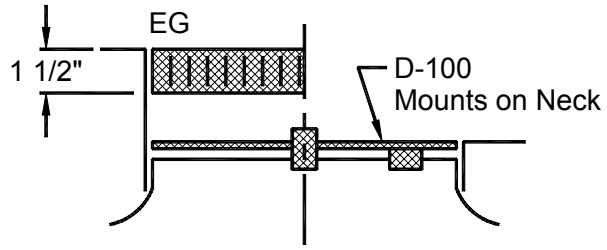
☐ **Model EG Equalizing Grid**



Model AG-100 damper is available in duct sizes 6 thru 14 inches only

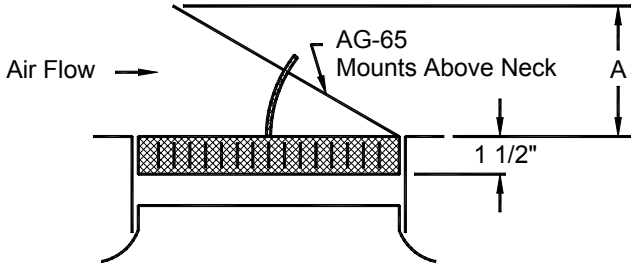
☐ **Model D-100 Radial Sliding Blade Damper ***

☐ **Model EG Equalizing Grid**



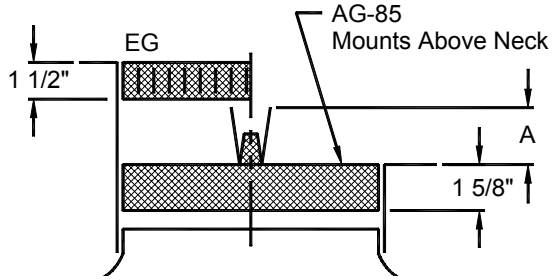
Model D-100 damper is available in duct sizes 6 thru 14 inches only.

☐ **Model AG-65 Combination Damper and Equalizing Grid ***



☐ **Model AG-85 Butterfly Damper ***

☐ **Model EG Equalizing Grid**

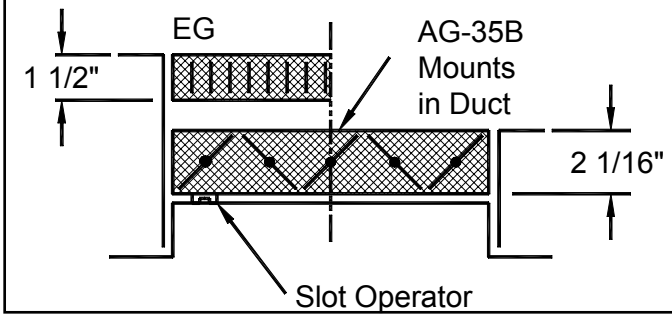


Accessories (Optional) for Rectangular Neck

Check ☐ if provided

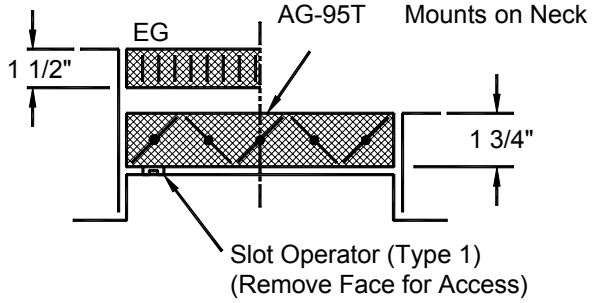
☐ **Model AG-35B Opposed Blade Damper**

☐ **Model EG Equalizing Grid**



☐ **Model AG-95 Opposed Blade Damper with Slot Operator**

☐ **Model EG Equalizing Grid**



All dimensions are in inches.

Accessories (Optional)

Check ☐ if provided

Accessories		Nominal Round Duct Sizes					
		6	8	10	12	14	16
☐	AG-100	•	•	•	•	•	N/A
☐	D-100	•	•	•	•	•	N/A
☐	AG-85	•	•	•	•	•	•
☐	AG-65	•	•	•	•	•	•
☐	EG	•	•	•	•	•	•
☐	EQT	•	•	•	•	•	•

• Available Sizes

Accessories		Nominal Rectangular Duct Sizes
☐	AG-95 Type 1	Available in Sizes 6 x 6 through 18 x 18
☐	AG-35B	
☐	EG-L/EG-S	
☐	AG-65-L/AG-65-S	
☐	EQT	

(Please see reverse side).

Other Accessories (Optional)

Standard Finish: #26 White

☐ **Model SR Square-to-Round Transition**

Optional Patterns

Check ☐ selection

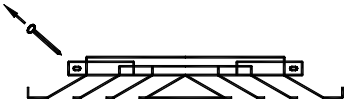
1 Way	☐ S1 Square	☐ A1	☐ B1
2 Way	☐ A2	☐ S2 Square	☐ B2
2 Way Corner	☐ E2	☐ F2	☐ G2 Square
3 Way	☐ A3 ($X \geq Y$); ☐ E3 ($X > 2Y$); ☐ A3-2 ($X > Y$, $X < 2Y$); ☐ B3 ($X = 2Y$)		
4 Way	☐ A4 Square	☐ B4	

For A3, $X \geq Y$
For A3-2, $X > Y$, $X < 2Y$
For B3, $X = 2Y$
For E3, $X > 2Y$

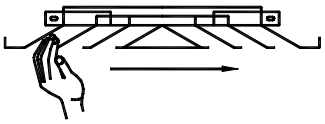
* Dimensions X and Y shown here are the proportions of available rectangular duct sizes. Duct sizes are available in 3" increments. Dimension X is always the longer dimension for each core option.

Removing Center Core

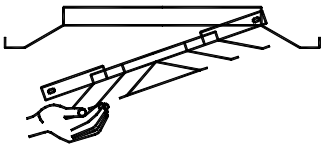
1. Remove shipping clips.



2. Push core sideways against spring.



3. Hold core securely and allow to drop down.



General Description

- TITUS Model TDV is a high capacity ceiling diffuser. Because it maintains an unbroken horizontal flow pattern from maximum cfm down to minimum, it is an excellent choice for variable air volume application.
- Core is removable from the face of the diffuser.
- Slot operator on optional, neck-mounted Model AG-95 damper allows easy volume adjustment by removing the diffuser core. (Rectangular necks only).
- Model TDV is extremely flexible, with cores available for 1, 2, 3 or 4-way horizontal flow patterns.
- Material is heavy gauge steel.
- The TITUS TDV has louvered face with integrated induction vanes for exceptional air mixing.

Note: This submittal is meant to demonstrate general dimensions of this product. The drawing on this submittal are not meant to detail every aspect of the product with exactness. Drawings are not to scale. TITUS reserves the right to make changes without written notice.

Performance Data • Round Neck

TDV • Louvered Face, Induction Vanes • Horizontal Discharge Pattern

Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	78		98		117		137		156		176		215	
		Total Pressure	0.031		0.050		0.071		0.097		0.126		0.160		0.239	
		NC	9		15		20		24		28		31		37	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
6	S1	X	78	6-9-17	98	7-11-20	117	9-13-21	137	10-15-23	156	12-17-25	176	13-19-26	215	16-21-29
x	S2&G2	X & Y	39	3-5-10	49	4-6-12	59	5-7-15	69	6-9-16	78	6-10-17	88	7-11-19	108	9-13-21
6	A3	X	28	3-4-8	37	3-5-9	44	4-6-9	52	5-7-10	59	5-8-11	66	6-8-12	81	7-9-13
6"		Y	19	2-3-6	25	3-4-8	29	3-5-9	34	4-5-10	39	4-6-11	44	5-7-12	54	6-8-13
Round	A4	X & Y	19	2-3-6	29	3-4-8	34	3-5-9	39	4-5-10	44	4-6-11	54	5-7-12	64	6-8-13
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	98		117		137		156		176		215		254	
		Total Pressure	0.050		0.071		0.097		0.126		0.160		0.239		0.334	
		NC	15		20		24		28		31		37		41	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
9	S1	X	98	7-11-20	117	9-13-21	137	10-15-23	156	12-17-25	176	13-19-26	215	16-21-29	254	18-22-32
x	S2&G2	X & Y	49	4-6-12	59	5-7-15	69	6-9-16	78	6-10-17	88	7-11-19	108	9-13-21	127	11-16-22
9	A3	X	37	3-5-9	44	4-6-9	52	5-7-10	59	5-8-11	66	6-8-12	81	7-9-13	96	8-10-14
6"		Y	25	3-4-8	29	3-5-9	34	4-5-10	39	4-6-11	44	5-7-12	54	6-8-13	64	7-10-14
Round	A4	X & Y	25	3-4-8	29	3-5-9	34	4-5-10	39	4-6-11	44	5-7-12	54	6-8-13	64	7-10-14
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	139		174		209		244		279		314		383	
		Total Pressure	0.032		0.049		0.071		0.097		0.127		0.161		0.239	
		NC	10		16		21		25		29		32		38	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
9	S1	X	139	8-12-23	174	10-15-26	209	12-18-29	244	14-21-31	279	16-23-33	314	18-25-35	383	22-27-39
x	S2&G2	X & Y	70	4-6-13	87	5-8-16	105	6-10-19	122	8-11-22	140	9-13-23	157	10-15-25	192	12-18-27
9	A3	X	52	4-5-10	66	4-7-11	79	5-8-13	92	6-9-14	105	7-10-15	119	8-11-15	145	10-12-17
8"		Y	35	3-4-8	44	3-5-10	52	4-6-12	61	5-7-14	70	6-8-15	79	6-9-16	96	8-11-17
Round	A4	X & Y	35	3-4-8	44	3-5-10	52	4-6-12	61	5-7-14	70	6-8-15	79	6-9-16	96	8-11-17
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	174		209		244		279		314		383		453	
		Total Pressure	0.049		0.071		0.097		0.127		0.161		0.239		0.335	
		NC	16		21		25		29		32		38		42	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
12	S1	X	174	10-15-26	209	12-18-29	244	14-21-31	279	16-23-33	314	18-25-35	383	22-27-39	453	24-30-42
x	S2&G2	X & Y	87	5-8-16	105	6-10-19	122	8-11-22	140	9-13-23	157	10-15-25	192	12-18-27	227	14-21-30
12	A3	X	66	4-7-11	79	5-8-13	92	6-9-14	105	7-10-15	119	8-11-15	145	10-12-17	171	11-13-18
8"		Y	44	3-5-10	52	4-6-12	61	5-7-14	70	6-8-15	79	6-9-16	96	8-11-17	113	9-13-19
Round	A4	X & Y	44	3-5-10	52	4-6-12	61	5-7-14	70	6-8-15	79	6-9-16	96	8-11-17	113	9-13-19
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	218		272		327		381		447		490		599	
		Total Pressure	0.032		0.049		0.072		0.097		0.127		0.161		0.240	
		NC	11		17		22		26		30		33		38	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
12	S1	X	218	10-15-29	272	12-18-33	327	15-22-36	381	17-26-39	436	20-29-41	490	22-31-44	599	27-34-48
x	S2&G2	X & Y	109	5-8-16	136	7-10-20	164	8-12-24	191	9-14-27	218	11-16-29	245	12-18-31	300	15-22-34
12	A3	X	82	4-7-13	103	6-8-14	123	7-10-16	144	8-12-17	165	9-13-18	185	10-14-19	226	12-15-21
10"		Y	55	3-5-10	68	4-6-13	82	5-8-16	95	6-9-17	109	7-10-18	123	8-12-20	150	9-14-22
Round	A4	X & Y	55	3-5-10	68	4-6-13	82	5-8-16	95	6-9-17	109	7-10-18	123	8-12-20	150	9-14-22
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	235		314		392		471		549		628		706	
		Total Pressure	0.020		0.035		0.055		0.079		0.107		0.140		0.177	
		NC	-		15		20		25		29		33		36	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
12	S1	X	235	9-14-27	314	12-18-35	392	15-23-39	471	18-27-43	549	21-32-46	628	24-35-50	706	27-37-53
x	S2&G2	X & Y	118	5-7-15	157	7-10-20	196	8-12-25	236	10-15-30	275	12-17-33	314	13-20-35	353	15-22-37
12	A3	X	89	4-6-12	119	5-8-15	148	7-10-17	178	8-12-19	207	10-14-20	237	11-15-22	267	12-16-23
12"		Y	59	2-5-10	79	4-6-13	98	5-8-16	118	6-10-19	137	7-11-21	157	8-13-22	177	10-14-23
Round	A4	X & Y	59	2-5-10	79	4-6-13	98	5-8-16	118	6-10-19	137	7-11-21	157	8-13-22	177	10-14-23
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	314		392		471		549		623		706		863	
		Total Pressure	0.035		0.055		0.079		0.107		0.138		0.177		0.264	
		NC	13		19		24		28		32		35		40	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
15	S1	X	314	12-18-35	392	15-23-39	471	18-27-43	549	21-32-46	623	24-35-49	706	27-37-53	863	33-41-58
x	S2&G2	X & Y	157	7-10-20	196	8-12-25	236	10-15-30	275	12-17-33	312	13-20-35	353	15-22-37	432	18-27-41
15	A3	X	119	5-8-15	148	7-10-17	178	8-12-19	207	10-14-20	235	11-15-22	267	12-16-23	326	15-18-26
12"		Y	79	4-6-13	98	5-8-16	118	6-10-19	137	7-11-21	156	8-13-22	177	10-14-23	216	12-17-26
Round	A4	X & Y	79	4-6-13	98	5-8-16	118	6-10-19	137	7-11-21	156	8-13-22	177	10-14-23	216	12-17-26

- All pressures are in inches of water.
- Throw velocities given are for isothermal terminal velocities of 150, 100 and 50 fpm. See the section, Engineering Guidelines for additional information.
- NC values based on Octave Band 2 to 7 sound power levels minus a room absorption of 10 dB.
- Dash (-) in space denotes an NC value less than 10.
- Data obtained from tests conducted in accordance with ANSI/ASHRAE Standard 70-2006.
- Throw values given are for isothermal conditions.

For Performance Notes, please refer to page F166.

Performance Data • Round Neck (continued)
TDV • Louvered Face, Induction Vanes • Horizontal Discharge Pattern

Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	320		427		534		641		748		855		863	
		Total Pressure	0.018		0.032		0.050		0.072		0.097		0.127		0.130	
		NC	5		12		18		23		27		31		31	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
15 x 15 14" Round	S1	X	320	10-15-31	427	14-21-41	534	17-26-46	641	21-31-50	748	24-36-54	855	28-41-58	863	28-41-58
	S2&G2	X & Y	160	6-9-17	214	8-11-23	267	9-14-28	321	11-17-34	374	13-20-38	428	15-23-41	432	15-23-41
	A3	X	121	4-7-14	161	6-9-18	202	8-12-20	242	9-14-22	282	11-16-24	323	12-18-25	326	13-18-26
		Y	80	3-5-11	107	5-7-14	134	6-9-18	160	7-11-22	187	8-13-24	214	10-14-26	216	10-15-26
	A4	X & Y	80	3-5-11	107	5-7-14	134	6-9-18	160	7-11-22	187	8-13-24	214	10-14-26	216	10-15-26
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	98		117		137		156		176		215		254	
		Total Pressure	0.048		0.069		0.094		0.122		0.155		0.232		0.324	
		NC	15		20		24		28		31		37		41	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
18 x 18 6" Round	S1	X	98	7-11-20	117	9-13-21	137	10-15-23	156	12-17-25	176	13-19-26	215	16-21-29	254	18-22-32
	S2&G2	X & Y	49	4-6-12	59	5-7-15	69	6-9-16	78	6-10-17	88	7-11-19	108	9-13-21	127	11-16-22
	A3	X	37	3-5-9	44	4-6-9	52	5-7-10	59	5-8-11	66	6-8-12	81	7-9-13	96	8-10-14
		Y	25	3-4-8	29	3-5-9	34	4-5-10	39	4-6-11	44	5-7-12	54	6-8-13	64	7-10-14
	A4	X & Y	25	3-4-8	29	3-5-9	34	4-5-10	39	4-6-11	44	5-7-12	54	6-8-13	64	7-10-14
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	174		209		244		279		314		383		453	
		Total Pressure	0.047		0.067		0.092		0.120		0.152		0.226		0.317	
		NC	16		21		25		29		32		38		42	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
18 x 18 8" Round	S1	X	174	10-15-26	209	12-18-29	244	14-21-31	279	16-23-33	314	18-25-35	383	22-27-39	453	24-30-42
	S2&G2	X & Y	87	5-8-16	105	6-10-19	122	8-11-22	140	9-13-23	157	10-15-25	192	12-18-27	227	14-21-30
	A3	X	66	4-7-11	79	5-8-13	92	6-9-14	105	7-10-15	119	8-11-15	145	10-12-17	171	11-13-18
		Y	44	3-5-10	52	4-6-12	61	5-7-14	70	6-8-15	79	6-9-16	96	8-11-17	113	9-13-19
	A4	X & Y	44	3-5-10	52	4-6-12	61	5-7-14	70	6-8-15	79	6-9-16	96	8-11-17	113	9-13-19
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	218		272		327		381		436		490		599	
		Total Pressure	0.029		0.045		0.066		0.089		0.117		0.147		0.220	
		NC	11		17		22		26		30		33		38	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
18 x 18 10" Round	S1	X	218	10-15-29	272	12-18-33	327	15-22-36	381	17-26-39	436	20-29-41	490	22-31-44	599	27-34-48
	S2&G2	X & Y	109	5-8-16	136	7-10-20	164	8-12-24	191	9-14-27	218	11-16-29	245	12-18-31	300	15-22-34
	A3	X	82	4-7-13	103	6-8-14	123	7-10-16	144	8-12-17	165	9-13-18	185	10-14-19	226	12-15-21
		Y	55	3-5-10	68	4-6-13	82	5-8-16	95	6-9-17	109	7-10-18	123	8-12-20	150	9-14-22
	A4	X & Y	55	3-5-10	68	4-6-13	82	5-8-16	95	6-9-17	109	7-10-18	123	8-12-20	150	9-14-22
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	314		392		471		549		623		706		863	
		Total Pressure	0.031		0.048		0.070		0.095		0.122		0.157		0.234	
		NC	13		19		24		28		32		35		40	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
18 x 18 12" Round	S1	X	314	12-18-35	392	15-23-39	471	18-27-43	549	21-32-46	623	24-35-49	706	27-37-53	863	33-41-58
	S2&G2	X & Y	157	7-10-20	196	8-12-25	236	10-15-30	275	12-17-33	312	13-20-35	353	15-22-37	432	18-27-41
	A3	X	119	5-8-15	148	7-10-17	178	8-12-19	207	10-14-20	235	11-15-22	267	12-16-23	326	15-18-26
		Y	79	4-6-13	98	5-8-16	118	6-10-19	137	7-11-21	156	8-13-22	177	10-14-23	216	12-17-26
	A4	X & Y	79	4-6-13	98	5-8-16	118	6-10-19	137	7-11-21	156	8-13-22	177	10-14-23	216	12-17-26
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	427		534		641		748		855		962		1175	
		Total Pressure	0.027		0.042		0.060		0.081		0.106		0.135		0.201	
		NC	12		18		23		27		31		34		40	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
18 x 18 14" Round	S1	X	427	14-21-41	534	17-26-46	641	21-31-50	748	24-36-54	855	28-41-58	962	31-43-61	1175	38-48-68
	S2&G2	X & Y	214	8-11-23	267	9-14-28	321	11-17-34	374	13-20-38	428	15-23-41	481	17-26-43	588	21-31-48
	A3	X	161	6-9-18	202	8-12-20	242	9-14-22	282	11-16-24	323	12-18-25	363	14-19-27	444	17-21-30
		Y	107	5-7-14	134	6-9-18	160	7-11-22	187	8-13-24	214	10-14-26	241	11-16-27	294	13-20-30
	A4	X & Y	107	5-7-14	134	6-9-18	160	7-11-22	187	8-13-24	214	10-14-26	241	11-16-27	294	13-20-30
Return Factors -SP = 1.1 TP Add 1 to NC		Total cfm	628		698		837		977		1256		1530		1808	
		Total Pressure	0.032		0.039		0.056		0.077		0.126		0.188		0.262	
		NC	16		19		24		28		35		40		45	
		Side	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw	cfm	Throw
18 x 18 16" Round	S1	X	628	18-27-50	698	20-30-52	837	24-35-57	977	28-41-62	1256	35-50-70	1530	43-55-77	1808	49-60-84
	S2&G2	X & Y	314	10-15-29	349	11-16-32	419	13-19-39	488	15-23-44	628	19-29-50	765	24-36-55	904	28-42-60
	A3	X	237	8-12-22	263	9-13-23	316	11-16-25	369	12-19-27	474	16-22-31	578	20-24-34	683	21-26-37
		Y	157	6-9-19	174	7-10-21	209	8-12-25	244	10-14-28	314	12-19-31	383	15-23-35	452	18-27-38
	A4	X & Y	157	6-9-19	174	7-10-21	209	8-12-25	244	10-14-28	314	12-19-31	383	15-23-35	452	18-27-38

- All pressures are in inches of water.
- Throw velocities given are for isothermal terminal velocities of 150, 100 and 50 fpm. See the section, Engineering Guidelines for additional information.
- NC values based on Octave Band 2 to 7 sound power levels minus a room absorption of 10 dB.
- Dash (-) in space denotes an NC value less than 10.
- Data obtained from tests conducted in accordance with ANSI/ASHRAE Standard 70-2006.
- Throw values given are for isothermal conditions.

For Performance Notes, please refer to page F166.

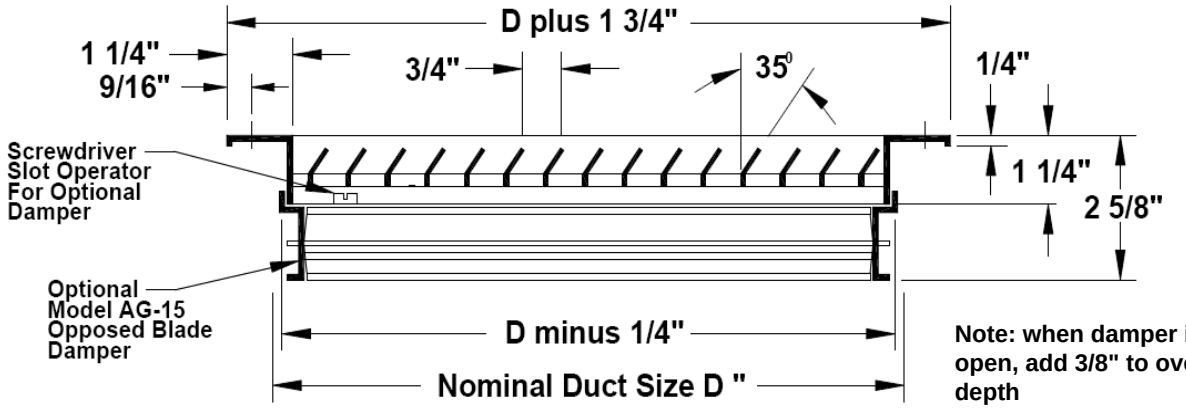
Titus Submittal

G-350F-1.0 10-1-10

☐ **350FL** • 35° Deflection • Long Blades • ¾" Blades Spacing
☐ **350FS** • 35° Deflection • Short Blades • ¾" Blades Spacing

Louvered Return Grilles • Aluminum

☐ Border Type 1 (Surface Mount)



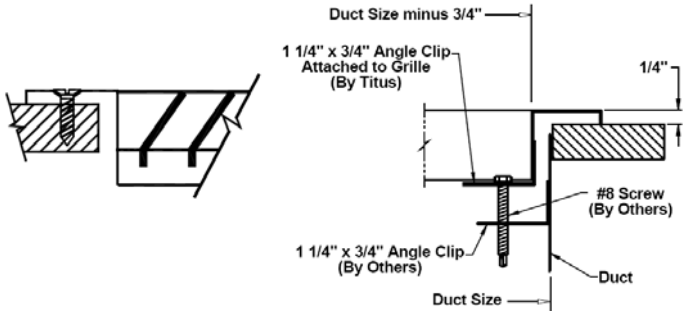
Available Sizes (D" x D")

Border Type 1 is available in sizes 6" x 4" through 48" x 48" in 2" increments in one piece construction. Odd and fractional sizes are available at additional cost. Sizes larger than 48" x 48" are shipped in multiple sections with joining strips for field assembly.

Note: Wall or duct opening should be duct size ± 1/8". All dimensions are in inches.

Fastenings

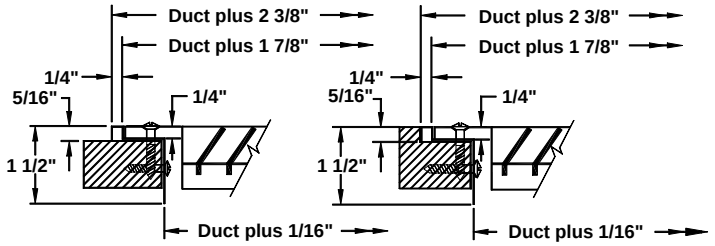
☐ Type A • External Screw ☐ Type C • Concealed Screw



Type A & C available with Border Type 1 only. Type C available with damper

Mounting Frames

☐ PF • Steel Plaster Frame ☐ PFA • Aluminum Plaster Frame



Surface Mounted Example **Recessed Mounted Example**

Note: Wall opening should be listed duct size + 1/8" to listed duct size + 1/4".

Accessories (Optional) Check ☑ if provided.

☐ Neck mounted opposed blade damper (galvanized steel)
☐ EQT • Earthquake Tabs
☐ IS • Insect Screen (1/16" square mesh – galvanized steel)
☐ DS • Debris Screen (¼" square mesh – galvanized steel)
☐ Other: _____

Standard Finish: #26 White

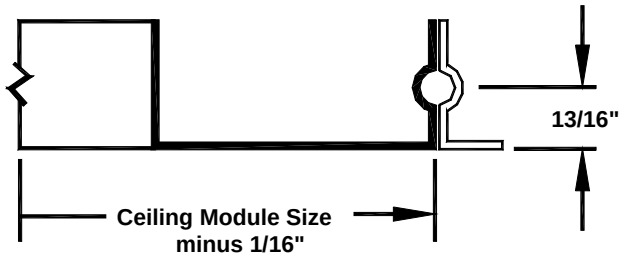
☐ Other Finish: _____

General Description

- Available with louvers vertical or horizontal.
- #8 x 11/4" lg. Phillips flat head sheet metal screws painted white.
- Optional opposed blade damper has screwdriver adjustment accessible through face of grille.
- Insect screen & debris screen are not available with damper option
- Material is Aluminum.
- All dimensions are ± 1/16".

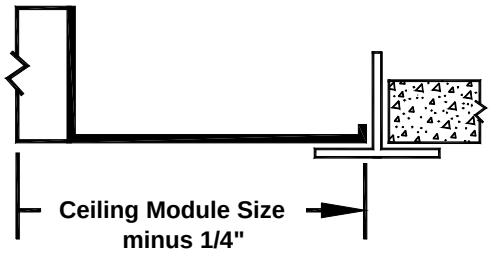
Optional Border Types Available

☐ Border Type 2 (Snap-in)
Panel Mounted



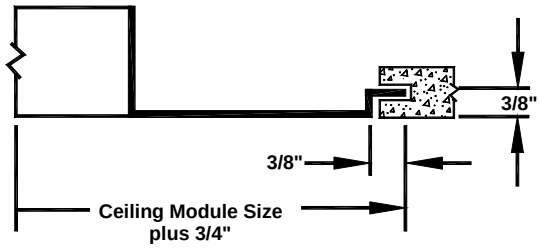
Available in 24” x 24” modules with neck sizes up to 20” x 20”.

☐ Border Type 3 (Lay-in)
Panel Mounted



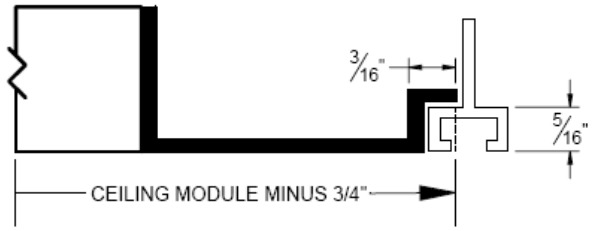
Available in all standard module sizes with neck sizes up to module size minus 2”.

☐ Border Type 4 (Spline)
Panel Mounted



Available in 24” x 24” modules with neck sizes up to 20” x 20”.
Splines on 2 opposite sides only

☐ Border Type NT (Narrow Tee)



NT Border is available in module sizes 24" x 12" & 24" x 24" only.

Border Type 2, 3, 4, NT

- Accessories & Options

Check ☑ if provided.

☐ AG-15 • Neck mounted opposed blade damper (galvanized steel)

☐ IS • Insect Screen (1/16” square mesh – galvanized steel)

☐ DS • Debris Screen (1/4” square mesh – galvanized steel)

☐ EQT • Earthquake tabs

☐ Other: _____

Standard Finish: #26 White

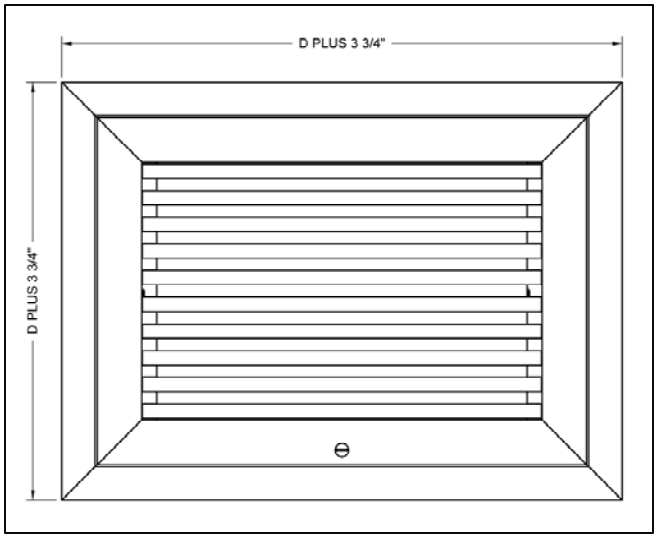
☐ Optional finish: _____

Titus Submittal

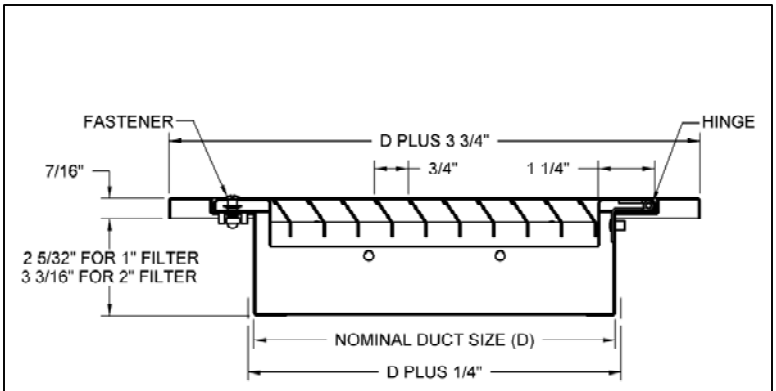
G-350FF-1.0 3-31-10

Louvered Return Filter Grilles • Aluminum • ¾" Blade Spacing

Models: 350FLF1 • 35° Fixed Deflection • Long Blades • 1" Filter Frame
350FSF1 • 35° Fixed Deflection • Short Blades • 1" Filter Frame
350FLF2 • 35° Fixed Deflection • Long Blades • 2" Filter Frame
350FSF2 • 35° Fixed Deflection • Short Blades • 2" Filter Frame



Face View:
Border Type 1 (Surface Mount) & Border Type 3 (Lay-in T-Bar)



Duct opening should be nominal duct size (D) plus ¼".

Side Cross-Sectional View:
Border Type 1 (Surface Mount) & Border Type 3 (Lay-in T-Bar)

Hinge Location Options:

- ☐ Hinged Top
- ☐ Hinged Left
- ☐ Hinged Right
- ☐ Hinged Bottom
- ☐ No Hinge

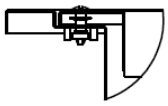
Finish Options:

Standard Finish: #26 White

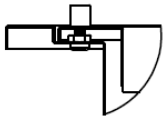
☐ Other Finish: _____

Fastening Options:

☐ Quarter-Turn Fastener (standard)



☐ Knurled Knob (optional)



Available Sizes: 10" x 8" to 48" x 36" in one-inch increments. Fractional and oversize filter grilles are not available. Maximum size for border type 3 is module size minus 4".

All dimensions are in inches.

General Description

- Series 350 filter grilles feature louvers spaced ¾" apart.
- 350 models are available in common filter sizes. 1" thick filters may be purchased from hardware stores for the most common sizes.
- Blade deflection angle is 35°.
- Quarter turn fasteners are standard to make filter access easy.
- Knurled knob fastener available as option
- All dimensions are ± 1/16".
- Filters by others
- Dimensions are the same for border type 1 (surface mount) and border type 3 (lay-in T-bar)

Titus®

Note: This submittal is meant to demonstrate general dimensions of this product. The drawings on this submittal are not meant to detail every aspect of the product with exactness. Drawings are not to scale. TITUS reserves the right to make changes without written notice.

605 Shiloh Road • Plano, Texas 75074• 972-212-4800

PERFORMANCE DATA

300/350 Grilles

350R, 350F AND 350R-SS
PERFORMANCE BASED ON NOMINAL SIZES SHOWN IN BOLD.

Nominal Duct Size (in.)	Nominal Duct Area (ft²)	Core Area (ft²)	Core Velocity Velocity Pressure Neg. Static Pressure	100 0.001 0.002	200 0.002 0.008	300 0.006 0.018	400 0.010 0.032	500 0.016 0.051	600 0.022 0.073	700 0.031 0.099	800 0.040 0.130	900 0.050 0.164
6x6	**0.25**	**0.19**	Airflow, cfm	19	38	57	76	95	114	133	152	171
			NC	-	-	-	-	-	13	19	25	29
8x6	**0.33**	**0.26**	Airflow, cfm	26	52	78	104	130	156	182	208	234
			NC	-	-	-	-	-	15	20	26	30
10x6	**0.42**	**0.34**	Airflow, cfm	34	68	102	136	170	204	238	272	306
			NC	-	-	-	-	-	16	21	28	32
8x8	**0.44**	**0.37**	Airflow, cfm	37	74	111	148	185	222	259	296	333
			NC	-	-	-	-	-	16	22	28	32
12x6	**0.5**	**0.41**	Airflow, cfm	41	82	123	164	205	246	287	328	369
			NC	-	-	-	-	-	17	22	30	34
14x6	**0.58**	**0.48**	Airflow, cfm	48	96	144	192	240	288	336	384	432
			NC	-	-	-	-	-	18	24	30	34
16x6 **12x8**	**0.67**	**0.57**	Airflow, cfm	57	114	171	228	285	342	399	456	513
			NC	-	-	-	-	10	19	25	30	35
10x10	**0.69**	**0.59**	Airflow, cfm	59	118	177	236	295	354	413	472	531
			NC	-	-	-	-	10	19	25	31	35
18x6	**0.75**	**0.63**	Airflow, cfm	63	126	189	252	315	378	441	504	567
			NC	-	-	-	-	10	19	25	32	35
20x6 **12x10**	**0.83**	**0.72**	Airflow, cfm	72	144	216	288	360	432	504	576	648
			NC	-	-	-	-	11	19	25	30	35
22x6	**0.92**	**0.77**	Airflow, cfm	77	154	231	308	385	462	539	616	693
			NC	-	-	-	-	11	19	25	30	35
24x6 **12x12**	**1**	**0.88**	Airflow, cfm	88	176	264	352	440	528	616	704	792
			NC	-	-	-	-	11	19	25	30	35
30x6 **18x10**	**1.25**	**1.11**	Airflow, cfm	111	222	333	444	555	666	777	888	999
			NC	-	-	-	-	12	20	26	32	35
14x14	**1.36**	**1.22**	Airflow, cfm	122	244	366	488	610	732	854	976	1098
			NC	-	-	-	-	12	20	27	32	35
36x6 **18x12**	**1.5**	**1.35**	Airflow, cfm	135	270	405	540	675	810	945	1080	1215
			NC	-	-	-	-	13	20	27	32	35
22x10	**1.53**	**1.37**	Airflow, cfm	137	274	411	548	685	822	959	1096	1233
			NC	-	-	-	-	13	20	27	32	36
30x8 **24x10**	**1.67**	**1.49**	Airflow, cfm	149	298	447	596	745	894	1043	1192	1341
			NC	-	-	-	-	14	21	27	33	37
42x6 **18x14**	**1.75**	**1.59**	Airflow, cfm	159	318	477	636	795	954	1113	1272	1431
			NC	-	-	-	-	14	21	27	33	37
16x16	**1.78**	**1.62**	Airflow, cfm	162	324	486	648	810	972	1134	1296	1458
			NC	-	-	-	-	14	21	27	33	37
24x12 18x16	**2**	**1.82**	Airflow, cfm	182	364	546	728	910	1092	1274	1456	1638
			NC	-	-	-	-	14	21	28	33	38
18x18	**2.25**	**2.07**	Airflow, cfm	207	414	621	828	1035	1242	1449	1656	1863
			NC	-	-	-	-	14	21	28	33	38
24x14	**2.33**	**2.14**	Airflow, cfm	214	428	642	856	1070	1284	1498	1712	1926
			NC	-	-	-	-	14	22	28	33	38
30x12	**2.5**	**2.29**	Airflow, cfm	229	458	687	916	1145	1374	1603	1832	2061
			NC	-	-	-	-	15	22	28	33	38
24x16	**2.67**	**2.46**	Airflow, cfm	246	492	738	984	1230	1476	1722	1968	2214
			NC	-	-	-	-	15	22	29	34	39
20x20	**2.78**	**2.57**	Airflow, cfm	257	514	771	1028	1285	1542	1799	2056	2313
			NC	-	-	-	-	16	23	29	34	39
36x12	**3**	**2.75**	Airflow, cfm	275	550	825	1100	1375	1650	1925	2200	2475
			NC	-	-	-	-	16	23	29	34	39
30x16 **24x20**	**3.33**	**3.11**	Airflow, cfm	311	622	933	1244	1555	1866	2177	2488	2799
			NC	-	-	-	-	17	24	30	35	40
22x22	**3.36**	**3.14**	Airflow, cfm	314	628	942	1256	1570	1884	2198	2512	2826
			NC	-	-	-	-	17	24	30	35	40
42x12 36x14	**3.5**	**3.22**	Airflow, cfm	322	644	966	1288	1610	1932	2254	2576	2898
			NC	-	-	-	-	17	24	30	36	40
24x22	**3.67**	**3.43**	Airflow, cfm	343	686	1029	1372	1715	2058	2401	2744	3087
			NC	-	-	-	-	17	24	30	36	40
30x18	**3.75**	**3.5**	Airflow, cfm	350	700	1050	1400	1750	2100	2450	2800	3150
			NC	-	-	-	-	17	24	30	36	40

NC-20 NC-30 NC-40

- Static pressures are negative, in inches of water, measured per ANSI/ASHRAE Standard 70-2006.
- NC based on room absorption of 10 dB, re 10^{-12} watts, measured per ANSI/ASHRAE Standard 70-2006.

Department of Veterans Affairs

Memorandum

Date: JAN 4 2012

From: Assistant Deputy Under Secretary for Health for Clinical Operations (10NC)

Subj: Interim Guidance for Ventilation Requirements in Sterile Processing Service (SPS)

To: VISN Directors, VISN CMOs, VISN QMOs, VISN Nurse Executives, VISN Sterile Processing Boards

1. This memorandum extends interim guidance for ventilation requirements in Sterile Processing Services pending the release of a formal directive.

2. The following are the minimum number of air exchanges per hour (ACH) based on the functional area and the Design Temperature for existing buildings:

a. Soiled / decontamination
   i. Airflow = Negative (in)
   ii. Minimum ACH = 6 (Temp 72-78 F)
   iii. Relative Humidity Range = 20% to 60%
b. Sterilizer Equipment Access Room
   i. Airflow = Negative (in)
   ii. Minimum ACH = 10 (Temp N/R)
   iii. Relative Humidity Range = N/R
c. Restrooms / Housekeeping
   i. Airflow = Negative (in)
   ii. Minimum ACH = 10 (Temp N/R)
   iii. Relative Humidity Range = N/R
d. Preparation, Assembly, Sterilization Area
   i. Airflow = Positive (out)
   ii. Minimum ACH = 4 (72 – 78 F)
   iii. Relative Humidity Range = 20% to 60%
e. Clean / Sterile Storage
   i. Airflow = Positive (out)
   ii. Minimum ACH = 4 (Temp 72 – 78F)
   iii. Relative Humidity Range = 20% to 60%

3. The following are the minimum number of air exchanges per hour (ACH) based on the functional area and the Design Temperature for new construction and renovations involving replacement of HVAC systems:

a. Soiled / decontamination
   a. Airflow = Negative (in)
   b. Minimum ACH = 6 (Temp 72 +/- 1F)
   c. Relative Humidity Range = 20% to 60%

b. Sterilizer Equipment Access Room
   i. Airflow = Negative (in)
   ii. Minimum ACH = 10 (Temp N/R)
   iii. Relative Humidity Range = N/R
c. Restrooms / Housekeeping
   i. Airflow = Negative (in)
   ii. Minimum ACH = 10 (Temp N/R)
   iii. Relative Humidity Range = N/R
d. Preparation, Assembly, Sterilization Area
   i. Airflow = Positive (out)
   ii. Minimum ACH = 4 (72 +/- 1F)
   iii. Relative Humidity Range = 20% to 60%
e. Clean / Sterile Storage
   i. Airflow = Positive (out)
   ii. Minimum ACH = 4 (Temp 72 +/- 1F)
   iii. Relative Humidity Range = 20% to 60%

4. Effective immediately all references in VA Handbook 7176 dealing with ventilation are superseded.

5. All new construction and HVAC renovations should comply with the design parameters identified above which meet or exceed those set forth in ANSI/ ASHRAE/ ASHE Standard 170 – 2008 or the current version, Ventilation of Health Care Facilities and should comply with the VA SPS Design Guide.

6. This memorandum remains in effect until December 31, 2012, or until the appropriate directive is published, whichever comes first.

7. Point of contact for questions is Tommy Stewart, Acting Director, National Program Office for Sterile Processing, at (202) 461-7139 or Tommy.Stewart@va.gov.

George W. Arana, MD

Table 7-1 CLIMATIC CONDITIONS

Location	Weather Station	North Latitude	MSL Elevation	Col. 1a 0.4%		Col. 1b 99.6%	Col. 2a 1%		Col. 2b 99%	Col. 3 Wet Bulb		Annual Extreme Daily-Mean Db	
				Temperatures									
				Summer		Winter	Summer		Winter	0.4%	1%	Maximum	Minimum
				Db	Wb	Db	Db	Wb	Db				
Oklahoma City	Oklahoma City Will Rogers World AP	35.39	1306	99.5	74.1	11.4	96.8	74.1	17.4	77.7	76.7	102.7	6.1
OREGON													
Portland	Portland Intl AP	45.59	108	91.2	67.5	23.9	87.1	66.5	28.6	69.4	67.8	99.0	20.5
Roseburg*	Roseburg AP	43	505	93	69	18	90	67	18	-	-	-	-
White City	Medford Rogue Valley Intl AP	42.39	1329	98.6	67.2	22.9	95.3	65.9	25.7	69.0	67.5	104.2	18.1
PENNSYLVANIA													
Altoona	Altoona Blair Co AP	40.30	1470	88.5	72.0	4.7	85.7	70.7	9.6	74.7	73.2	92.5	-2.6
Butler*	Butler Co (AWOS)	40.78	1247	88.0	72.4	3.1	84.4	70.6	8.9	74.6	73.0	91.1	-2.3
Coatesville*	New Castle	41	825	91	75	2	88	74	2	-	-	-	-
Erie	Erie Intl AP	42.08	738	86.4	72.9	5.2	84.0	71.6	9.7	75.3	73.8	91.5	-0.5
Lebanon	Harrisburg Capital City AP	40.22	348	92.4	73.8	8.7	89.6	72.5	13.3	76.5	75.2	96.3	1.6
Philadelphia	Philadelphia Intl AP	39.87	30	93.2	75.4	12.6	90.6	74.5	16.9	78.3	77.0	97.0	6.6
Pittsburgh	Pittsburgh Intl AP	40.50	1204	89.5	72.5	3.7	86.6	71.1	9.4	75.2	73.7	92.4	-3.0
Wilkes-Barre	Wilkes-Barre Scranton Intl AP	41.34	961	88.9	72.1	3.5	86.0	70.6	8.3	75.0	73.3	93.0	-2.7
PUERTO RICO													
San Juan	San Juan Intl AP	18.42	62	91.4	77.4	69.1	89.6	77.8	70.2	80.6	79.9	93.9	66.8

SPD CLEAN - ROOM DATA SHEET

ROOM NAME	INDOOR TEMPERATURE				INDOOR RELATIVE HUMIDITY		MIN TOTAL ACH	MIN OA ACH	ROOM AIR RETURN EXHAUST (G) EXHAUST (S)	MAX NOISE LEVEL NC	ROOM AIR BALANCE	INDIVIDUAL ROOM CONTROL	
	COOLING		HEATING		% RH	% RH						TEMP	FLOW
	F	C	F	C	MAX	MIN							
Non Sterile Storage	72	22	72	22	60	20	4	4	Exhaust (G)	40	(+)	Yes	CV
Note 1 - None													
PPE	72	22	72	22	60	20	10	10	Exhaust (G)	40	(+)	Yes	CV
Note 1- Room Air Balance Provide a dedicated terminal unit to serve Clean Lockers - Men and Women. Provide transfer air, as required, from Sterile/Non Sterile Storage. The space air shall infiltrate to the Clean Toilet/Showers - Men and Women.													
Preparation, Assembly, and Sterilization Area	72	22	72	22	60	20	4	4	Exhaust (G)	40	(+ +)	Yes	CV
Note 1 - Room Air Changes per Hour Minimum (total and outdoor) air changes specified for this room are based on ASHRAE Standard 170 - 2008. Actual air changes may vary based on the transfers air requirements of the adjoining spaces (ETO Sterilizer Room and Decontamination Area), cooling load to meet the space temperature, and transfer air to the clean storage spaces to maintain positive air balance. **Note 2 - Room Air Balance** Provide simple devices, such as, ball-in-tube or flutter strips to show the airflow direction. Device shall be installed between Preparation, Assembly, and Sterilization Area and the Sterile/Non Sterile Storage Area. Provide airflow control valves in the exhaust air ducts to measure and monitor the design air balance.												
Receiving & Breakout	72	22	72	22	60	20	6	6	Exhaust (G)	40	(+)	Yes	CV
Note 1 - None													

SPD CLEAN - ROOM DATA SHEET

ROOM NAME	INDOOR TEMPERATURE				INDOOR RELATIVE HUMIDITY		MIN TOTAL ACH	MIN OA ACH	ROOM AIR RETURN EXHAUST (G) EXHAUST (S)	MAX NOISE LEVEL NC	ROOM AIR BALANCE	INDIVIDUAL ROOM CONTROL	
	COOLING		HEATING		% RH	% RH						TEMP	FLOW
	F	C	F	C	MAX	MIN							
Satellite SPD Storage	NA	NA	NA	NA	NA	NA	4	2	Return	40	(+)	No	CV
Note 1- Ventilation Air Requirement Do not provide 100% outdoor air to, or 100% exhaust from, the SPD Storage Room and Warehouses remotely located from the Central SPD Department. **Note 2 - Individual Room Temperature Control** Not required for rooms of 80 to 100 sf [8 to 10 m^2]. Required for larger rooms with intermittent occupancy. **Note 3 - Return Air Pick-Up** Return air from rooms under 100 sf [10 m^2] is optional. **Note 4 - Room Air Balance** Provide supply air from an adjoining air terminal unit.													
Scope Storage Room	NA	NA	NA	NA	NA	NA	4	4	NA	40	(+)	No	CV
Note 1 - Room Air Balance Allow room air to ex-filtrate into the Endoscope Processing/High Level Decontamination Room. Maintain Endoscope Processing/High Level Decontamination Room under negative air balance and the Scope Storage Room under positive air balance.													
Staff Breakroom/Conference	75	24	70	21	60	20	6	4	Exhaust (G)	35	(o)	Yes	CV
Note - None													
Sterile Storage	72	22	72	22	60	20	4	4	Exhaust (G)	40	(+)	Yes	CV
Note 1 - None													

Improve Emergency Cache - 19

Location	**Lebanon, PA**
Building owner	
Program user	**Miller-Remick LLC**
Company	**Miller-Remick LLC**
Comments	

By	**Miller-Remick**
Dataset name	**C:\Users\mprzybylski\Documents\TRACE 700 Projects\BLDG 19.TRC**

Calculation time	**05:48 PM on 01/21/2013**
TRACE® 700 version	**6.2.9**

Location	**Harrisburg, Pennsylvania**	
Latitude	**40.0**	**deg**
Longitude	**76.0**	**deg**
Time Zone	**5**	
Elevation	**335**	**ft**
Barometric pressure	**29.5**	**in. Hg**
Air density	**0.0751**	**lb/cu ft**
Air specific heat	**0.2444**	**Btu/lb·°F**
Density-specific heat product	**1.1011**	**Btu/h·cfm·°F**
Latent heat factor	**4,846.9**	**Btu·min/h·cu ft**
Enthalpy factor	**4.5046**	**lb·min/hr·cu ft**
Summer design dry bulb	**92**	**°F**
Summer design wet bulb	**77**	**°F**
Winter design dry bulb	**0**	**°F**
Summer clearness number	**1.00**	
Winter clearness number	**1.00**	
Summer ground reflectance	**0.20**	
Winter ground reflectance	**0.20**	
Carbon Dioxide Level	**400**	**ppm**

Design simulation period	**January - December**
Cooling load methodology	**RTS (ASHRAE Tables)**
Heating load methodology	**UATD**

Room Checksums

By Miller-Remick

Elevator Machine Room

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 4
Outside Air: OADB/WB/HR: 74 / 68 / 92

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	254	126	380	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	254	126	380	1
Internal Loads				
Lights	300	75	375	1
People	0	0	0	0
Misc	30,000	0	30,000	98
Sub Total ==>	30,300	75	30,375	99
Ceiling Load	4	-4	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	30,559	197	30,756	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 4
OADB: 74

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	254	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	254	1
Internal Loads		
Lights	300	1
People	0	0
Misc	30,000	98
Sub Total ==>	30,300	99
Ceiling Load	4	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	30,559	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-751	-1,126	100.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-751	-1,126	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-8	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-760	-1,126	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.5
Ra Plenum	75.1	69.8
Return	75.1	69.8
Ret/OA	75.1	69.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,388	1,388
Terminal	1,388	1,388
Main Fan	1,388	1,388
Sec Fan	0	0
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	0	0
Return	1,388	1,388
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	12.62	12.62
cfm/ton	541.42	
ft²/ton	42.92	
Btu/hr·ft²	279.60	-10.23
No. People	0	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	2.6	30.8	30.8	1,388	75.1	56.9	41.0	55.0	48.5	40.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.6	30.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	233	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.1	1,388	69.8	70.5
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-1.1			

Room Checksums

By Miller-Remick

Mechanical Room

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	683	171	853	26
People	688	0	688	21
Misc	427	0	427	13
Sub Total ==>	1,797	171	1,967	59
Ceiling Load	80	-80	0	0
Ventilation Load	0	0	1,382	42
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		-28	-28	-1
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,877	63	3,322	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 15
OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	683	45
People	344	22
Misc	427	28
Sub Total ==>	1,453	95
Ceiling Load	80	5
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	1,533	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	0	0	0.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	-1,982	100.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	0	-1,982	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	72.0
Ra Plenum	73.0	72.0
Return	73.0	72.0
Ret/OA	78.8	50.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	82	82
Terminal	82	82
Main Fan	82	82
Sec Fan	0	0
Nom Vent	25	25
AHU Vent	25	25
Infil	0	0
MinStop/Rh	0	0
Return	82	82
Exhaust	25	25
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	30.5	30.5
cfm/ft²	0.33	0.33
cfm/ton	295.79	
ft²/ton	903.04	
Btu/hr·ft²	13.29	-7.93
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	3.3	2.1	82	78.8	67.0	81.7	55.0	53.9	61.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	3.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	250		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.0	82	50.0	72.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-0.5	82	50.0	55.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-2.0			

Room Checksums

By Miller-Remick

Storage 1 (Clean)

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 16
Outside Air: OADB/WB/HR: 92 / 76 / 109

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	1,369	1,369	2
Glass Solar	4,763	0	4,763	8
Glass/Door Cond	1,121	0	1,121	2
Wall Cond	456	212	668	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	6,340	1,580	7,920	14
Internal Loads				
Lights	3,304	826	4,130	7
People	3,025	0	3,025	5
Misc	1,877	0	1,877	3
Sub Total ==>	8,206	826	9,032	16
Ceiling Load	2,498	-2,498	0	0
Ventilation Load	0	0	20,662	37
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	18,786		18,786	33
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	35,830	-92	56,400	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 18
OADB: 89

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	7,131	21
Glass/Door Cond	915	3
Wall Cond	454	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	8,500	25
Internal Loads		
Lights	3,304	10
People	1,513	4
Misc	1,877	5
Sub Total ==>	6,693	20
Ceiling Load	2,772	8
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	34,317	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-1,794	2.74
Glass Solar	0	0	0.00
Glass/Door Cond	-4,677	-4,677	7.15
Wall Cond	-1,505	-2,434	3.72
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-6,182	-8,905	13.61
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,704	0	0.00
Ventilation Load	0	-29,069	44.44
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-27,454	41.97
Additional Reheat		0	0.00
System Plenum Heat		18	-0.03
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-8,886	-65,409	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	76.4
Ra Plenum	79.2	64.2
Return	72.0	72.0
Ret/OA	76.0	57.6
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,833	1,833
Terminal	1,833	1,833
Main Fan	1,833	1,833
Sec Fan	0	0
Nom Vent	367	367
AHU Vent	367	367
Infil	0	0
MinStop/Rh	1,833	1,833
Return	1,833	1,833
Exhaust	367	367
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	20.0	20.0
cfm/ft²	1.67	1.67
cfm/ton	390.07	
ft²/ton	234.04	
Btu/hr·ft²	51.27	-59.46
No. People	6	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	4.7	56.4	42.3	1,833	76.0	63.6	69.3	55.0	53.2	58.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4.7	56.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	1,100		
Part	0		
Int Door	0		
ExFlr	0		
Roof	410	0	0
Wall	626	116	18
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-43.2	1,833	55.0	76.4
Aux Htg	0.0	0	0.0	0.0
Preheat	-22.2	367	0.0	55.0
Reheat	-34.3	1,833	55.0	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-65.4			

Room Checksums

By Miller-Remick

Storage 2 (Sterile)

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 92 / 76 / 114

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	1,166	1,166	2
Glass Solar	1,442	0	1,442	3
Glass/Door Cond	551	0	551	1
Wall Cond	191	97	287	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	2,183	1,263	3,446	7
Internal Loads				
Lights	2,703	676	3,379	7
People	2,475	0	2,475	5
Misc	1,536	0	1,536	3
Sub Total ==>	6,714	676	7,390	16
Ceiling Load	1,870	-1,870	0	0
Ventilation Load	0	0	18,115	38
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	18,549		18,549	39
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	29,315	69	47,500	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 18
OADB: 89

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	3,410	12
Glass/Door Cond	437	2
Wall Cond	188	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	4,035	14
Internal Loads		
Lights	2,703	10
People	1,238	4
Misc	1,536	5
Sub Total ==>	5,476	20
Ceiling Load	2,268	8
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	16,299	58
Grand Total ==>	28,078	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-1,794	3.50
Glass Solar	0	0	0.00
Glass/Door Cond	-2,235	-2,235	4.35
Wall Cond	-622	-1,022	1.99
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-2,857	-5,051	9.84
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,213	0	0.00
Ventilation Load	0	-23,784	46.35
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-22,462	43.77
Additional Reheat		0	0.00
System Plenum Heat		-18	0.04
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-5,069	-51,315	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.1
Ra Plenum	78.6	64.2
Return	72.0	72.0
Ret/OA	76.1	57.6
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,500	1,500
Terminal	1,500	1,500
Main Fan	1,500	1,500
Sec Fan	0	0
Nom Vent	300	300
AHU Vent	300	300
Infil	0	0
MinStop/Rh	1,500	1,500
Return	1,500	1,500
Exhaust	300	300
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	20.0	20.0
cfm/ft²	1.67	1.67
cfm/ton	378.95	
ft²/ton	227.37	
Btu/hr·ft²	52.78	-57.02
No. People	5	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	4.0	47.5	34.9	1,500	76.1	63.8	70.3	55.0	53.2	58.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4.0	47.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	900		
Part	0		
Int Door	0		
ExFlr	0		
Roof	410	0	0
Wall	270	55	20
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-33.2	1,500	55.0	75.1
Aux Htg	0.0	0	0.0	0.0
Preheat	-18.2	300	0.0	55.0
Reheat	-28.1	1,500	55.0	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-51.3			

Room Checksums

By Miller-Remick

Vending Room

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	314	79	393	7
People	259	0	259	5
Misc	4,215	0	4,215	76
Sub Total ==>	4,788	79	4,866	88
Ceiling Load	11	-11	0	0
Ventilation Load	0	0	682	12
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		-4	-4	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	4,798	64	5,545	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 15
OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	314	7
People	144	3
Misc	4,215	90
Sub Total ==>	4,673	100
Ceiling Load	11	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	4,683	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	0	0	0.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	0	0	0.00
Ventilation Load	0	-886	100.01
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	-0.01
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	0	-886	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.0
Ra Plenum	75.3	70.0
Return	75.3	70.0
Ret/OA	76.2	66.2
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	213	213
Terminal	213	213
Main Fan	213	213
Sec Fan	0	0
Nom Vent	12	12
AHU Vent	12	12
Infil	0	0
MinStop/Rh	0	0
Return	213	213
Exhaust	12	12
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	5.4	5.4
cfm/ft²	1.85	1.85
cfm/ton	460.25	
ft²/ton	248.88	
Btu/hr·ft²	48.22	-7.71
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.5	5.5	5.0	213	76.2	61.6	59.6	55.0	52.5	55.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.5	5.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	115		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-0.9	213	66.2	70.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-0.9			

PROJECT INFORMATION

Location	
Building owner	
Program user	
Company	
Comments	

By	**Miller-Remick**
Dataset name	**C:\Users\mprzybylski\Documents\TRACE 700 Projects\BLDG22.TRC**
Calculation time	**06:08 PM on 01/21/2013**
TRACE® 700 version	**6.2.9**
Location	**Harrisburg, Pennsylvania**
Latitude	**40.0 deg**
Longitude	**76.0 deg**
Time Zone	**5**
Elevation	**335 ft**
Barometric pressure	**29.5 in. Hg**
Air density	**0.0751 lb/cu ft**
Air specific heat	**0.2444 Btu/lb·°F**
Density-specific heat product	**1.1011 Btu/h·cfm·°F**
Latent heat factor	**4,846.9 Btu·min/h·cu ft**
Enthalpy factor	**4.5046 lb·min/hr·cu ft**
Summer design dry bulb	**92 °F**
Summer design wet bulb	**77 °F**
Winter design dry bulb	**0 °F**
Summer clearness number	**1.00**
Winter clearness number	**1.00**
Summer ground reflectance	**0.20**
Winter ground reflectance	**0.20**
Carbon Dioxide Level	**400 ppm**
Design simulation period	**January - December**
Cooling load methodology	**RTS (ASHRAE Tables)**
Heating load methodology	**UATD**

Room Checksums

By Miller-Remick

Bulk Storage Room

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	2,747	0	2,747	7
Glass/Door Cond	1,020	0	1,020	3
Wall Cond	507	428	935	2
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	4,275	428	4,703	12
Internal Loads				
Lights	6,052	1,513	7,565	19
People	550	0	550	1
Misc	3,439	0	3,439	9
Sub Total ==>	10,041	1,513	11,554	30
Ceiling Load	550	-550	0	0
Ventilation Load	0	0	5,870	15
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	14,992		14,992	38
Exhaust Heat		-96	-96	0
Sup. Fan Heat			1,990	5
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	29,858	1,295	39,013	100.00

CLG SPACE PEAK

Mo/Hr: 6 / 9
OADB: 75

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	6,764	23
Glass/Door Cond	-147	0
Wall Cond	384	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	7,002	24
Internal Loads		
Lights	6,052	20
People	275	1
Misc	3,439	12
Sub Total ==>	9,766	33
Ceiling Load	522	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	29,583	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-4,955	-4,955	13.23
Wall Cond	-1,994	-3,747	10.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-6,949	-8,701	23.23
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-383	0	0.00
Ventilation Load	0	-7,765	20.73
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		67	-0.18
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-21,544	57.51
Additional Reheat		0	0.00
System Plenum Heat		483	-1.29
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-7,332	-37,461	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	75.0
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	77.1	64.2
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	1,343	1,343
Terminal	1,343	1,343
Main Fan	1,343	1,343
Sec Fan	0	0
Nom Vent	101	101
AHU Vent	101	101
Infil	0	0
MinStop/Rh	1,343	1,343
Return	1,343	1,343
Exhaust	101	101
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	7.5	7.5
cfm/ft²	0.67	0.67
cfm/ton	413.20	
ft²/ton	619.79	
Btu/hr·ft²	19.36	-18.59
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	3.3	39.0	34.7	1,343	77.1	62.5	62.3	53.7	52.4	57.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3.3	39.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	2,015		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	1,020	126	12
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-31.5	1,343	53.7	75.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-6.0	101	0.0	53.7
Reheat	-24.2	1,343	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-37.5			

Project Name:
Dataset Name: BLDG22.TRC

Room Checksums

By Miller-Remick

Electrical Storage Room

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	1,682	420	2,102	19
People	550	0	550	5
Misc	956	0	956	9
Sub Total ==>	3,188	420	3,608	33
Ceiling Load	153	-153	0	0
Ventilation Load	0	0	1,631	15
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	5,156		5,156	47
Exhaust Heat		-27	-27	0
Sup. Fan Heat			553	5
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	8,496	241	10,922	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 23
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	1,682	20
People	275	3
Misc	956	12
Sub Total ==>	2,913	35
Ceiling Load	161	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	5,148	63
Grand Total ==>	8,222	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	0	0	0.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-106	0	0.00
Ventilation Load	0	-2,158	25.45
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		18	-0.22
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-5,987	70.61
Additional Reheat		0	0.00
System Plenum Heat		-353	4.16
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-106	-8,480	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.3
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	77.1	64.2
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	373	373
Terminal	373	373
Main Fan	373	373
Sec Fan	0	0
Nom Vent	28	28
AHU Vent	28	28
Infil	0	0
MinStop/Rh	373	373
Return	373	373
Exhaust	28	28
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	7.5	7.5
cfm/ft²	0.67	0.67
cfm/ton	410.18	
ft²/ton	615.27	
Btu/hr·ft²	19.50	-15.14
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.9	10.9	9.5	373	77.1	62.5	62.3	53.7	52.3	57.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.9	10.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	560		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-6.8	373	53.7	70.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-1.7	28	0.0	53.7
Reheat	-6.7	373	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-8.5			

Room Checksums

By Miller-Remick

Office 01

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	343	0	343	6
Glass/Door Cond	142	0	142	3
Wall Cond	89	72	161	3
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	573	72	645	12
Internal Loads				
Lights	436	109	544	10
People	450	0	450	8
Misc	495	0	495	9
Sub Total ==>	1,380	109	1,489	28
Ceiling Load	40	-40	0	0
Ventilation Load	0	0	2,816	52
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	336		336	6
Exhaust Heat		-46	-46	-1
Sup. Fan Heat			143	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	2,329	95	5,383	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 9
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	910	41
Glass/Door Cond	26	1
Wall Cond	85	4
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	1,021	46
Internal Loads		
Lights	436	19
People	250	11
Misc	495	22
Sub Total ==>	1,180	53
Ceiling Load	39	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,241	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-688	-688	12.16
Wall Cond	-347	-639	11.30
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-1,035	-1,327	23.46
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-28	0	0.00
Ventilation Load	0	-3,725	65.84
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		32	-0.56
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-838	14.81
Additional Reheat		0	0.00
System Plenum Heat		201	-3.55
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,063	-5,658	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	80.0
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	83.9	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	102	97
Terminal	102	97
Main Fan	102	97
Sec Fan	0	0
Nom Vent	48	48
AHU Vent	48	48
Infil	0	0
MinStop/Rh	97	97
Return	102	97
Exhaust	48	48
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	47.5	50.0
cfm/ft²	0.70	0.67
cfm/ton	226.81	
ft²/ton	323.22	
Btu/hr·ft²	37.13	-39.02
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.5	5.4	3.3	97	83.9	69.5	86.6	53.7	51.7	54.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.5	5.4								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	145		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	170	18	10
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.8	97	53.7	80.0
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.9	48	0.0	53.7
Reheat	-1.7	97	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-5.7			

Room Checksums

By Miller-Remick

Office 02

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	328	0	328	7
Glass/Door Cond	142	0	142	3
Wall Cond	95	76	172	3
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	565	76	642	13
Internal Loads				
Lights	405	101	507	10
People	450	0	450	9
Misc	461	0	461	9
Sub Total ==>	1,316	101	1,418	28
Ceiling Load	37	-37	0	0
Ventilation Load	0	0	2,622	52
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	264		264	5
Exhaust Heat		-43	-43	-1
Sup. Fan Heat			133	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	2,182	98	5,035	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 9
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	883	41
Glass/Door Cond	26	1
Wall Cond	91	4
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	1,000	46
Internal Loads		
Lights	405	19
People	250	12
Misc	461	21
Sub Total ==>	1,116	52
Ceiling Load	36	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	2,153	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-688	-688	12.84
Wall Cond	-368	-675	12.59
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-1,056	-1,363	25.43
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-26	0	0.00
Ventilation Load	0	-3,468	64.71
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		30	-0.55
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-780	14.55
Additional Reheat		0	0.00
System Plenum Heat		222	-4.13
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,082	-5,360	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	80.9
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	83.9	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	98	90
Terminal	98	90
Main Fan	98	90
Sec Fan	0	0
Nom Vent	45	45
AHU Vent	45	45
Infil	0	0
MinStop/Rh	90	90
Return	98	90
Exhaust	45	45
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	46.0	50.0
cfm/ft²	0.72	0.67
cfm/ton	232.96	
ft²/ton	321.73	
Btu/hr·ft²	37.30	-39.71
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.4	5.0	3.1	90	83.9	69.5	86.6	53.7	51.6	54.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.4	5.0								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	135		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	179	18	10
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.7	90	53.7	80.9
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.7	45	0.0	53.7
Reheat	-1.6	90	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-5.4			

Room Checksums

By Miller-Remick

Office 03

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 9
Outside Air: OADB/WB/HR: 79 / 71 / 100

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	883	0	883	21
Glass/Door Cond	26	0	26	1
Wall Cond	91	73	164	4
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	1,000	73	1,073	26
Internal Loads				
Lights	375	94	469	11
People	450	0	450	11
Misc	427	0	427	10
Sub Total ==>	1,252	94	1,346	33
Ceiling Load	34	-34	0	0
Ventilation Load	0	0	1,420	34
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	184		184	4
Exhaust Heat		-39	-39	-1
Sup. Fan Heat			140	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	2,470	94	4,124	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 9
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	883	42
Glass/Door Cond	26	1
Wall Cond	91	4
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	1,000	48
Internal Loads		
Lights	375	18
People	250	12
Misc	427	20
Sub Total ==>	1,052	50
Ceiling Load	34	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,086	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-688	-688	13.65
Wall Cond	-368	-675	13.38
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-1,056	-1,363	27.03
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-24	0	0.00
Ventilation Load	0	-3,212	63.70
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		28	-0.55
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-722	14.33
Additional Reheat		0	0.00
System Plenum Heat		228	-4.52
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,080	-5,042	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	81.8
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	77.5	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	95	83
Terminal	95	83
Main Fan	95	83
Sec Fan	0	0
Nom Vent	42	42
AHU Vent	42	42
Infil	0	0
MinStop/Rh	83	83
Return	95	83
Exhaust	42	42
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	44.0	50.0
cfm/ft²	0.76	0.67
cfm/ton	275.62	
ft²/ton	363.75	
Btu/hr·ft²	32.99	-40.33
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	4.1	2.7	95	77.5	65.5	76.5	53.7	50.9	51.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	4.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	125		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	179	18	10
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.6	83	53.7	81.8
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.5	42	0.0	53.7
Reheat	-1.5	83	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-5.0			

Room Checksums

By Miller-Remick

Office 04

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	328	0	328	7
Glass/Door Cond	142	0	142	3
Wall Cond	95	76	172	4
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	565	76	642	13
Internal Loads				
Lights	390	98	488	10
People	450	0	450	9
Misc	444	0	444	9
Sub Total ==>	1,284	98	1,382	28
Ceiling Load	36	-36	0	0
Ventilation Load	0	0	2,525	52
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	224		224	5
Exhaust Heat		-41	-41	-1
Sup. Fan Heat			128	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	2,109	97	4,859	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 9
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	883	42
Glass/Door Cond	26	1
Wall Cond	91	4
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	1,000	47
Internal Loads		
Lights	390	18
People	250	12
Misc	444	21
Sub Total ==>	1,084	51
Ceiling Load	35	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Grand Total ==>	2,119	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-688	-688	13.23
Wall Cond	-368	-675	12.97
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	-1,056	-1,363	26.21
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-25	0	0.00
Ventilation Load	0	-3,340	64.22
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		29	-0.55
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-751	14.45
Additional Reheat		0	0.00
System Plenum Heat		225	-4.32
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-1,081	-5,201	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	81.3
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	83.9	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	96	87
Terminal	96	87
Main Fan	96	87
Sec Fan	0	0
Nom Vent	43	43
AHU Vent	43	43
Infil	0	0
MinStop/Rh	87	87
Return	96	87
Exhaust	43	43
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	45.0	50.0
cfm/ft²	0.74	0.67
cfm/ton	237.66	
ft²/ton	321.05	
Btu/hr·ft²	37.38	-40.01
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.4	4.9	2.9	87	83.9	69.5	86.6	53.7	51.5	54.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.4	4.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	130		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	179	18	10
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-2.6	87	53.7	81.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.6	43	0.0	53.7
Reheat	-1.6	87	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-5.2			

Room Checksums

By Miller-Remick

Office 05

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	345	86	432	10
People	450	0	450	11
Misc	393	0	393	9
Sub Total ==>	1,188	86	1,274	30
Ceiling Load	31	-31	0	0
Ventilation Load	0	0	2,233	53
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	669		669	16
Exhaust Heat		-36	-36	-1
Sup. Fan Heat			114	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,888	19	4,254	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 23
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	345	20
People	250	15
Misc	393	23
Sub Total ==>	988	59
Ceiling Load	33	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	667	40
Grand Total ==>	1,688	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	0	0	0.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-22	0	0.00
Ventilation Load	0	-2,955	80.59
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		25	-0.69
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-665	18.13
Additional Reheat		0	0.00
System Plenum Heat		-72	1.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-22	-3,666	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.3
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	83.9	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	77	77
Terminal	77	77
Main Fan	77	77
Sec Fan	0	0
Nom Vent	38	38
AHU Vent	38	38
Infil	0	0
MinStop/Rh	77	77
Return	77	77
Exhaust	38	38
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	50.0	50.0
cfm/ft²	0.67	0.67
cfm/ton	216.27	
ft²/ton	324.40	
Btu/hr·ft²	36.99	-31.88
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	0.4	4.3	2.5	77	83.9	69.5	86.6	53.7	51.8	55.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.4	4.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	115		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.4	77	53.7	70.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.3	38	0.0	53.7
Reheat	-1.4	77	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-3.7			

Room Checksums

By Miller-Remick

Office 06 - Cubicle Area

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	3,724	931	4,655	10
People	3,600	0	3,600	8
Misc	4,232	0	4,232	9
Sub Total ==>	11,556	931	12,487	28
Ceiling Load	339	-339	0	0
Ventilation Load	0	0	24,082	53
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	7,910		7,910	17
Exhaust Heat		-392	-392	-1
Sup. Fan Heat			1,225	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	19,805	200	45,312	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 23
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	3,724	20
People	2,000	11
Misc	4,232	23
Sub Total ==>	9,956	55
Ceiling Load	357	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	7,891	43
Grand Total ==>	18,205	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	0	0	0.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-236	0	0.00
Ventilation Load	0	-31,858	80.59
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		273	-0.69
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-7,166	18.13
Additional Reheat		0	0.00
System Plenum Heat		-781	1.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-236	-39,533	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.3
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	83.9	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	827	827
Terminal	827	827
Main Fan	827	827
Sec Fan	0	0
Nom Vent	413	413
AHU Vent	413	413
Infil	0	0
MinStop/Rh	827	827
Return	827	827
Exhaust	413	413
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	50.0	50.0
cfm/ft²	0.67	0.67
cfm/ton	218.93	
ft²/ton	328.39	
Btu/hr·ft²	36.54	-31.88
No. People	8	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	3.8	45.3	27.3	827	83.9	69.5	86.6	53.7	52.0	56.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3.8	45.3								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	1,240		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-15.1	827	53.7	70.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-24.4	413	0.0	53.7
Reheat	-14.9	827	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-39.5			

Room Checksums

By Miller-Remick

Office 07

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	330	83	413	10
People	450	0	450	11
Misc	375	0	375	9
Sub Total ==>	1,156	83	1,238	30
Ceiling Load	30	-30	0	0
Ventilation Load	0	0	2,136	52
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	629		629	15
Exhaust Heat		-35	-35	-1
Sup. Fan Heat			109	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	1,815	18	4,078	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 23
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	330	20
People	250	15
Misc	375	23
Sub Total ==>	956	59
Ceiling Load	32	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	627	39
Grand Total ==>	1,615	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	0	0	0.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-21	0	0.00
Ventilation Load	0	-2,826	80.59
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		24	-0.69
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-636	18.13
Additional Reheat		0	0.00
System Plenum Heat		-69	1.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-21	-3,507	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.3
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	83.9	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	73	73
Terminal	73	73
Main Fan	73	73
Sec Fan	0	0
Nom Vent	37	37
AHU Vent	37	37
Infil	0	0
MinStop/Rh	73	73
Return	73	73
Exhaust	37	37
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	50.0	50.0
cfm/ft²	0.67	0.67
cfm/ton	215.81	
ft²/ton	323.71	
Btu/hr·ft²	37.07	-31.88
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.3	4.1	2.4	73	83.9	69.5	86.6	53.7	51.7	54.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.3	4.1								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	110		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.3	73	53.7	70.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.2	37	0.0	53.7
Reheat	-1.3	73	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-3.5			

Room Checksums

By Miller-Remick

Office 08

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 92 / 77 / 115

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	0	0	0	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	0	0	0	0
Internal Loads				
Lights	390	98	488	10
People	450	0	450	9
Misc	444	0	444	9
Sub Total ==>	1,284	98	1,382	29
Ceiling Load	36	-36	0	0
Ventilation Load	0	0	2,525	53
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	789		789	16
Exhaust Heat		-41	-41	-1
Sup. Fan Heat			128	3
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	2,109	21	4,783	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 23
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	0	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	0	0
Internal Loads		
Lights	390	20
People	250	13
Misc	444	23
Sub Total ==>	1,084	57
Ceiling Load	37	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	787	41
Grand Total ==>	1,909	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 0

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	0	0	0.00
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	0	0	0.00
Sub Total ==>	0	0	0.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-25	0	0.00
Ventilation Load	0	-3,340	80.59
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		29	-0.69
OA Preheat Diff.		0	0.00
RA Preheat Diff.		-751	18.13
Additional Reheat		0	0.00
System Plenum Heat		-82	1.98
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-25	-4,145	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	70.3
Ra Plenum	75.9	69.4
Return	75.9	69.4
Ret/OA	83.9	34.7
Fn MtrTD	0.1	0.0
Fn BldTD	0.3	0.0
Fn Frict	0.9	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	87	87
Terminal	87	87
Main Fan	87	87
Sec Fan	0	0
Nom Vent	43	43
AHU Vent	43	43
Infil	0	0
MinStop/Rh	87	87
Return	87	87
Exhaust	43	43
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	50.0	50.0
cfm/ft²	0.67	0.67
cfm/ton	217.45	
ft²/ton	326.17	
Btu/hr·ft²	36.79	-31.88
No. People	1	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter gr/lb	Leave DB °F	Leave WB °F	Leave gr/lb
Main Clg	0.4	4.8	2.9	87	83.9	69.5	86.6	53.7	51.9	55.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.4	4.8								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	130		
Part	128		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	0	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-1.6	87	53.7	70.3
Aux Htg	0.0	0	0.0	0.0
Preheat	-2.6	43	0.0	53.7
Reheat	-1.6	87	53.7	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-4.1			

10N Guidance

March 2011

Air Filtration Standards for SPD, Sterile Supply Areas, RME Reprocessing Areas

-New Facilities/Construction and AHU Replacements-

Functional Area	Pre-Filter Efficiency Pre-Fiter Set #1	Pre-Filter Efficiency Pre-Fiter Set #2	After/Final-Filter Efficiency	Centralized Monitoring of Filter Loading [1] (i.e. Building Automotion System)	Inspection Frequency [2]	Replacement Criteria
SPD- Soiled/Decontamination	Comply with the VA *HVAC Design Manual for Hospitals, Ambulatory Care, Outpatient Clinics, and Laboratories* (PG-18-10) dtd. March 2011			Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	1. Air filter loading reaches recommended optimum (obtained from filter manufacturer). Or 2. Evidence of damage, media deterioration, microbial growth. Or 3. Minimum space airflow (CFM) and ACH requirements cannot be achieved.
SPD- Preparation, Assembly, Sterilization Area				Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	
SPD- Sterilizer Equipment Room	N/A- Room supplied by transfer make-up air.					
SPD- Restrooms/Housekeeping	N/A- Room supplied by transfer make-up air.					
SPD- Clean/Sterile Storage	Comply with the VA HVAC Design Manual for Hospitals, Ambulatory Care, Outpatient Clinics, and Laboratories (PG-18-10) dtd. March 2011			Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	1. Air filter loading reaches recommended optimum (obtained from filter manufacturer). Or 2. Evidence of damage, media deterioration, microbial growth. Or 3. Minimum space airflow (CFM) and ACH requirements cannot be achieved.
Non-SPD- Sterile/Clean Supply Room (e.g. wards, clinics, etc.)				Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	
Non-SPD- RME Reprocessing Room (e.g. wards, clinics, etc.)				Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	

Notes: [1] Installed manometer or pressure differential device connected to building automation system for monitoring purposes.

[2] Inspection frequencies listed represent minimuns established by VHA and are not intended to preclude more frequent inspections necessitated by local conditions.

10N Guidance

Air Filtration Standards for SPD, Sterile Supply Areas, RME Reprocessing Areas

-Existing Facilities/Construction-

Functional Area	Pre-Filter Efficiency (minimum)	After/Final-Filter Efficiency (minimum)	Centralized monitoring of filter loading [1] (i.e. Building Automotion System)	Inspection Frequency [2]	Replacement Criteria
SPD- Soiled/Decontamination	Existing	VA Grade B (MERV 11)	No	Every three months check for filter loading and filter integrity.	1. Air filter loading reaches recommended optimum (obtained from filter manufacturer). Or 2. Evidence of damage, media deterioration, microbial growth. Or 3. Minimum space airflow (CFM) and ACH requirements cannot be achieved.
			Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	
SPD- Preparation, Assembly, Sterilization Area	Existing	VA Grade B (MERV 11)	No	Every three months check for filter loading and filter integrity.	
			Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	
SPD- Sterilizer Equipment Room	N/A- Room supplied by transfer make-up air.				
SPD- Restrooms/Housekeeping	N/A- Room supplied by transfer make-up air.				
SPD- Clean/Sterile Storage	Existing	VA Grade B (MERV 11)	No	Every three months check for filter loading and filter integrity.	1. Air filter loading reaches recommended optimum (obtained from filter manufacturer). Or 2. Evidence of damage, media deterioration, microbial growth. Or 3. Minimum space airflow (CFM) and ACH requirements cannot be achieved.
			Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	
Non-SPD- Sterile/Clean Supply Room (e.g. wards, clinics, etc.)	Existing	VA Grade B/C/D/E [3] (MERV 11/14/15/17)	No	Every three months check for filter loading and filter integrity.	
			Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	
Non-SPD- RME Reprocessing Room (e.g. wards, clinics, etc.)	Existing	VA Grade B/C/D/E [3] (MERV 11/14/15/17)	No	Every three months check for filter loading and filter integrity.	
			Yes	Continual monitoring of filter loading. Every six months check for filter integrity.	

Notes:

[1] Installed manometer or pressure differential device connected to building automation system for monitoring purposes.

[2] Inspection frequencies listed represent minimuns established by VHA and are not intended to preclude more frequent inspections necessitated by local conditions.

[3] Air filtration efficiency is determined by the most stringent requirement for the space function being served (i.e.- Dental Clinic, ICU, Pharmacy, Nursing Ward, ect.). As a minumum, After/Final-filter efficiency shall be equal or higher than VA Grade B (MERV 11).

Performance Climate Changer

Job Name	Miller Remick VA Lebanon Bldg 101 and Bldg 22
User Name	(T92)Andrew Bees
Address	Philadelphia Main Office

Performance Climate Changer — AHU 22

Quantity 1

Job Comments

Coil performance data is certified in accordance with AHRI standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are not covered under the scope of AHRI 410.

Air-handling performance data is certified in accordance with AHRI standard 430. Air handlers with plenum fans and vertical draw-thru air handlers where the coil is mounted immediately below the fan section are not covered under the scope of AHRI 430.

All weights and dimensions are approximate. Certified prints on request.

Performance Climate Changer

Unit level options — **Module Position:** 0

Actual airflow	3200 cfm	Installed weight	4222.7 lb
Unit elevation	0.00 ft	Rigging weight	3819.0 lb
Unit size	8	Single or front discharge - 63 Hz	91 dB
Integral base frame	6in. integral base frame	Single or front discharge - 125 Hz	90 dB
UL listed unit	UL listed unit	Single or front discharge - 250 Hz	77 dB
Circuit number 1	Supply fan motor(s)	Single or front discharge - 500 Hz	101 dB
FLA (CV) circuit 1	11.22 A	Single or front discharge - 1K Hz	94 dB
MCA circuit 1	13.97 A	Single or front discharge - 2K Hz	93 dB
MOP circuit 1	24.97 A	Single or front discharge - 4K Hz	84 dB
Fuse size circuit 1	20.00 A	Single or front discharge - 8K Hz	79 dB
Circuit number 2	Return/booster fan motor(s)	Inlet and casing - 63 Hz	94 dB
FLA (CV) circuit 2	5.02 A	Inlet and casing - 125 Hz	96 dB
MCA circuit 2	6.22 A	Inlet and casing - 250 Hz	75 dB
MOP circuit 2	11.02 A	Inlet and casing - 500 Hz	91 dB
Fuse size circuit 2	15.00 A	Inlet and casing - 1K Hz	77 dB
Circuit number 3	Lights + switch	Inlet and casing - 2K Hz	78 dB
FLA (CV) circuit 3	2.61 A	Inlet and casing - 4K Hz	76 dB
MCA circuit 3	3.26 A	Inlet and casing - 8K Hz	67 dB
MOP circuit 3	5.87 A	Ducted inlet - 63 Hz	85 dB
Fuse size circuit 3	15.00 A	Ducted inlet - 125 Hz	87 dB
Circuit number 4	Receptacle	Ducted inlet - 250 Hz	70 dB
FLA (CV) circuit 4	8.00 A	Ducted inlet - 500 Hz	87 dB
MCA circuit 4	10.00 A	Ducted inlet - 1K Hz	73 dB
MOP circuit 4	18.00 A	Ducted inlet - 2K Hz	76 dB
Fuse size circuit 4	15.00 A	Ducted inlet - 4K Hz	61 dB
Product group	Outdoor unit	Ducted inlet - 8K Hz	51 dB
Roof curb type	Standard roof curb	Casing - 63 Hz	86 dB
Modified coil - min face velocity	250 ft/min	Casing - 125 Hz	82 dB
Modified coil - max face velocity	600 ft/min	Casing - 250 Hz	69 dB
HEPA filter - min face velocity	0 ft/min	Casing - 500 Hz	85 dB
HEPA filter - max face velocity	600 ft/min	Casing - 1K Hz	78 dB
High voltage location	Right	Casing - 2K Hz	63 dB
Length	302.875 in	Casing - 4K Hz	55 dB
Width	50.500 in	Casing - 8K Hz	52 dB

Controls and VFD/starter — **Module Position:** 0

Factory controls package	No factory mount	Design Sequence	C
Automatic Selection	Validation Only	Number of transformers	1 - Transformer
Controller mounting	No mount	Prepackaged solution option used	MP common configuration not used
Controller type	No controller	Prepackaged solution valid unit	Non valid MP common configuration
LCD screen and keypad	No LCD	Total number of control points	2 control points

Warranty — **Module Position:** 0

Warranty section	Std. warranty only

Coil performance data is certified in accordance with AHRI standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are not covered under the scope of AHRI 410.

Air-handling performance data is certified in accordance with AHRI standard 430. Air handlers with plenum fans and vertical draw-thru air handlers where the coil is mounted immediately below the fan section are not covered under the scope of AHRI 430.

All weights and dimensions are approximate. Certified prints on request.

Performance Climate Changer

Pipe cabinet section — **Module Position:** 0

Pipe cabinet 1 side doors	One side door

Fan section — **Module Position:** 1

Fan sec [1]-1

Section type	Fan	Section width	50.500 in
Fan application	Return fan	Section weight	673.6 lb
Unit size	8	Static pressure origin	Program calculated
Inlet location	Bottom inlet	Single or front discharge - 63 Hz	76 dB
Fan orientation	Front-top discharge	Single or front discharge - 125 Hz	65 dB
Fan discharge	Front top	Single or front discharge - 250 Hz	59 dB
Access door location	Right	Single or front discharge - 500 Hz	55 dB
Drive location	Right side drive	Single or front discharge - 1K Hz	59 dB
Design sequence	E	Single or front discharge - 2K Hz	59 dB
Motor horsepower per fan	3 hp	Single or front discharge - 4K Hz	48 dB
NEMA nominal motor efficiency	89.50 %	Single or front discharge - 8K Hz	40 dB
Motor class	NEMA premium compliant ODP	Inlet and casing - 63 Hz	75 dB
Motor voltage	460/3	Inlet and casing - 125 Hz	73 dB
Cycle	60 cycles/sec	Inlet and casing - 250 Hz	66 dB
Drive service factor	1.5 fixed drive	Inlet and casing - 500 Hz	56 dB
Motor RPM	1800	Inlet and casing - 1K Hz	64 dB
Marine light	Marine LED light	Inlet and casing - 2K Hz	66 dB
Fan airflow	3200 cfm	Inlet and casing - 4K Hz	64 dB
Overall ESP	0.500 in H2O	Inlet and casing - 8K Hz	52 dB
Unit entering ESP	0.250 in H2O	Ducted inlet - 63 Hz	71 dB
Unit discharge ESP	0.250 in H2O	Ducted inlet - 125 Hz	64 dB
Elevation	0.00 ft	Ducted inlet - 250 Hz	56 dB
Minimum temperature	40.00 F	Ducted inlet - 500 Hz	50 dB
Design temperature	70.00 F	Ducted inlet - 1K Hz	55 dB
Fan size and type	10in. diameter FC, class 1	Ducted inlet - 2K Hz	56 dB
Total brake horsepower	1.901 hp	Ducted inlet - 4K Hz	54 dB
Total brake horsepower at min temp	2.015 hp	Ducted inlet - 8K Hz	42 dB
Total static pressure	1.276 in H2O	Casing - 63 Hz	73 dB
Speed	1194 rpm	Casing - 125 Hz	68 dB
Outlet area	1.04 sq ft	Casing - 250 Hz	63 dB
Fan outlet velocity	3086 ft/min	Casing - 500 Hz	60 dB
Fan module pressure drop	0.500 in H2O	Casing - 1K Hz	72 dB
Fan discharge loss pressure drop	0.000 in H2O	Casing - 2K Hz	52 dB
Section height	41.250 in	Casing - 4K Hz	33 dB
Section length	44.000 in	Casing - 8K Hz	24 dB

Coil performance data is certified in accordance with AHRI standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are not covered under the scope of AHRI 410.

Air-handling performance data is certified in accordance with AHRI standard 430. Air handlers with plenum fans and vertical draw-thru air handlers where the coil is mounted immediately below the fan section are not covered under the scope of AHRI 430.

Performance Climate Changer

Access section — **Module Position:** 2

Section type	Access/blank/turning	Design sequence	B
Unit size	8	Section length	10.000 in
Section size	Small	Section width	50.500 in
Front opening	Full Face	Section height	41.250 in
Back opening	Full Face	Section weight	83.8 lb

Controls section — **Module Position:** 3

Section type	Starter/VFD only	Ret/Exh fan high voltage door	Right
Unit size	Unit size 8	Design sequence	B
Starter/VFD	Return/exhaust section	Section length	24.500 in
NEMA application type	Internal NEMA	Section width	50.500 in
Access door location	Left	Section height	41.250 in
Access door swing direction	Outward swing	Section weight	280.9 lb

Economizer section — **Module Position:** 4

Economizer section type	Return fan economizer	Exhaust air damper type	Parallel blade damper
Outside air location	Left	Exhaust air hood type	Exhaust hood w/ bird screen
Outside air damper type	Parallel blade damper	Supply fan total air PD	0.196 in H2O
Outside air hood type	No inlet hood	Exhaust fan total air PD	0.776 in H2O
Return air damper type	Parallel blade damper		

Filter section — **Module Position:** 5

Section type	Filter	Filter condition	Mid-life
Unit size	8	Filter area	11.11 sq ft
Filter type	Angled filter	Filter face velocity	288 ft/min
Filter frame	2in. filter frame	Filter pressure drop	0.569 in H2O
Access door location	Right	Filter section pressure drop	0.569 in H2O
Primary filter type 1	Pleated media - MERV 8	Section length	26.500 in
Prefilter filter type	No prefilter	Section width	50.500 in
Design sequence	C	Section height	41.250 in
Filter airflow	3200 cfm	Section weight	236.7 lb

Access section — **Module Position:** 6

Section type	Access/blank/turning	Design sequence	B
Unit size	8	Marine light	Marine LED light
Section size	Medium	Section length	14.000 in
Access door location	Left	Section width	50.500 in
Door swing direction	Outward swing	Section height	41.250 in
Front opening	Full Face	Section weight	113.3 lb
Back opening	Full Face		

Coil performance data is certified in accordance with AHRI standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are not covered under the scope of AHRI 410.

Air-handling performance data is certified in accordance with AHRI standard 430. Air handlers with plenum fans and vertical draw-thru air handlers where the coil is mounted immediately below the fan section are not covered under the scope of AHRI 430.

All weights and dimensions are approximate. Certified prints on request.

Performance Climate Changer

Coil section

Module Position: 7

Coil se [4]-1

Section type	Horizontal coil	Rows	1 row
Unit size	8	Fin type	Sigma flo fins
Section size	Medium	Fin material	Aluminum fins
Coil application	Heating coil	Tube diameter	1in. tube diameter (25.4 mm)
Changeover coil	No	Tube matl/wall thickness	.031" (0.787mm) copper tubes
System type	Steam	Corrosion resistant coating	None
Coil supply/cabinet side	Right	Coil face velocity	492 ft/min
Coil casing	Galvanized	Air pressure drop	0.147 in H2O
Coil height	Unit coil height	J trap dimension	6.000 in
Drain pan	Stainless steel	H trap dimension	12.000 in
Drain connection location	Right	Fluid volume	1.29 gal
Design sequence	D	Steam pressure drop	11.072 in H2O
Apply AHRI ranges	Yes	Coil condensate	285.97 lb/hr
Coil performance airflow	3200 cfm	Total cap coil #1	270.69 MBh
Coil elevation	0.00 ft	Coil face area	6.50 sq ft
Entering dry bulb	0.00 F	Coil rigging weight	75.8 lb
Leaving dry bulb	78.00 F	Coil section pressure drop	0.147 in H2O
Total capacity	270.69 MBh	Section length	14.000 in
Fin spacing	77 Per Foot	Section height	41.250 in
Steam pressure	15.00 psig	Section width	50.500 in
Coil type	NS	Section weight	286.8 lb

Access section

Module Position: 8

Section type	Access/blank/turning	Design sequence	B
Unit size	8	Marine light	Marine LED light
Section size	Medium	Section length	14.000 in
Access door location	Left	Section width	50.500 in
Door swing direction	Outward swing	Section height	41.250 in
Front opening	Full Face	Section weight	141.5 lb
Back opening	Full Face		

Coil performance data is certified in accordance with AHRI standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are not covered under the scope of AHRI 410.

Air-handling performance data is certified in accordance with AHRI standard 430. Air handlers with plenum fans and vertical draw-thru air handlers where the coil is mounted immediately below the fan section are not covered under the scope of AHRI 430.

All weights and dimensions are approximate. Certified prints on request.

Performance Climate Changer

Coil section

Module Position: 9

Coil se [6]-1

Section type	Horizontal coil	Fluid type	Water
Unit size	8	Coil fluid percentage	100.00 %
Section size	Extended medium	Target valve pressure drop	4.00 psig
Coil application	Cooling coil	Coil type	UW
Changeover coil	No	Rows	8 rows
System type	Chilled water	Fin type	Delta flo H (Hi efficient)
Coil supply/cabinet side	Right	Fin material	Aluminum fins
Coil casing	Galvanized	Tube diameter	1/2in. tube diameter (12.7 mm)
Coil height	Unit coil height	Tube matl/wall thickness	.016" (0.406mm) copper tubes
Drain pan	Stainless steel	Corrosion resistant coating	None
Drain connection location	Right	Coil face velocity	401 ft/min
Design sequence	D	Air pressure drop	0.758 in H2O
Apply AHRI ranges	Yes	J trap dimension	2.051 in
Coil performance airflow	3200 cfm	H trap dimension	4.101 in
Coil elevation	0.00 ft	Leaving fluid temperature	55.00 F
Entering dry bulb	95.00 F	Fluid pressure drop	8.85 ft H2O
Entering wet bulb	76.00 F	Fluid volume	7.12 gal
Leaving dry bulb	52.00 F	Fluid velocity	4.02 ft/s
Leaving wet bulb	51.90 F	Coil face area	7.99 sq ft
Sensible capacity	152.72 MBh	Coil rigging weight	167.8 lb
Total capacity	258.91 MBh	Coil installed weight	227.4 lb
Fin spacing	120 Per Foot	Coil section pressure drop	0.758 in H2O
Entering fluid temperature	45.00 F	Section length	19.000 in
Fluid temperature rise	10.00 F	Section height	41.250 in
Standard fluid flow rate	51.60 gpm	Section width	50.500 in
Coil fouling factor	0.00000 hr-sq ft-deg F/Btu	Section weight	469.8 lb

Access section

Module Position: 10

Section type	Access/blank/turning	Design sequence	B
Unit size	8	Section length	10.000 in
Section size	Small	Section width	50.500 in
Front opening	Full Face	Section height	41.250 in
Back opening	Full Face	Section weight	83.8 lb

Controls section

Module Position: 11

Section type	Starter/VFD only	Design sequence	B
Unit size	Unit size 8	Section length	24.500 in
Starter/VFD	Supply section	Section width	50.500 in
NEMA application type	Internal NEMA	Section height	41.250 in
Supply fan high voltage door	Right	Section weight	278.0 lb

Coil performance data is certified in accordance with AHRI standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are not covered under the scope of AHRI 410.

Air-handling performance data is certified in accordance with AHRI standard 430. Air handlers with plenum fans and vertical draw-thru air handlers where the coil is mounted immediately below the fan section are not covered under the scope of AHRI 430.

All weights and dimensions are approximate. Certified prints on request.

Performance Climate Changer

Access section — **Module Position:** 12

Section type	Access/blank/turning	Design sequence	B
Unit size	8	Section length	10.000 in
Section size	Small	Section width	50.500 in
Front opening	Full Face	Section height	41.250 in
Back opening	Full Face	Section weight	91.8 lb

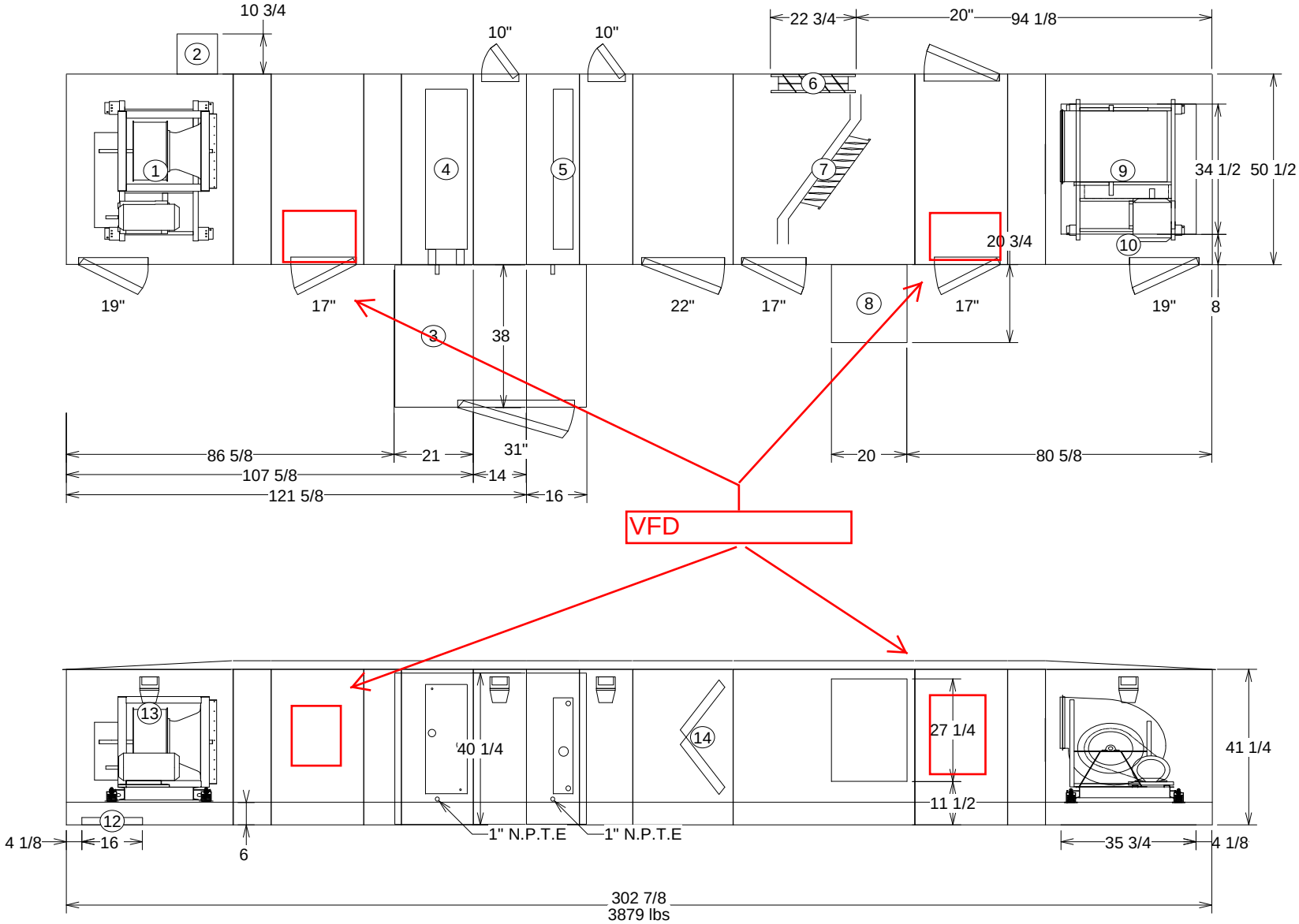
Fan section — **Module Position:** 13

Fan sec [7]-1

Section type	Fan	Section weight	787.6 lb
Fan application	Supply fan	Static pressure origin	Program calculated
Unit size	8	Single or front discharge - 63 Hz	91 dB
Inlet location	Back inlet	Single or front discharge - 125 Hz	90 dB
Fan orientation	Plenum fan	Single or front discharge - 250 Hz	77 dB
Fan discharge	Bottom front	Single or front discharge - 500 Hz	101 dB
Access door location	Right	Single or front discharge - 1K Hz	94 dB
Drive location	Right side drive	Single or front discharge - 2K Hz	93 dB
Design sequence	E	Single or front discharge - 4K Hz	84 dB
Motor horsepower per fan	7.5 hp	Single or front discharge - 8K Hz	79 dB
NEMA nominal motor efficiency	91.00 %	Inlet and casing - 63 Hz	94 dB
Motor class	NEMA premium compliant ODP	Inlet and casing - 125 Hz	96 dB
Motor voltage	460/3	Inlet and casing - 250 Hz	75 dB
Cycle	60 cycles/sec	Inlet and casing - 500 Hz	91 dB
Drive service factor	1.5 fixed drive	Inlet and casing - 1K Hz	77 dB
Motor RPM	1800	Inlet and casing - 2K Hz	78 dB
Marine light	Marine LED light	Inlet and casing - 4K Hz	76 dB
Fan airflow	3200 cfm	Inlet and casing - 8K Hz	67 dB
Overall ESP	2.000 in H2O	Ducted inlet - 63 Hz	85 dB
Unit entering ESP	1.000 in H2O	Ducted inlet - 125 Hz	87 dB
Unit discharge ESP	1.000 in H2O	Ducted inlet - 250 Hz	70 dB
Elevation	0.00 ft	Ducted inlet - 500 Hz	87 dB
Minimum temperature	40.00 F	Ducted inlet - 1K Hz	73 dB
Design temperature	70.00 F	Ducted inlet - 2K Hz	76 dB
Fan size and type	14in. belt-drive plenum, class 1	Ducted inlet - 4K Hz	61 dB
Plenum fan bottom discharge	1st bottom rectangular opening	Ducted inlet - 8K Hz	51 dB
Total brake horsepower	3.913 hp	Casing - 63 Hz	86 dB
Total brake horsepower at min temp	4.148 hp	Casing - 125 Hz	82 dB
Total static pressure	3.850 in H2O	Casing - 250 Hz	68 dB
Speed	2876 rpm	Casing - 500 Hz	85 dB
Fan module pressure drop	2.180 in H2O	Casing - 1K Hz	77 dB
Section height	41.250 in	Casing - 2K Hz	63 dB
Section length	44.000 in	Casing - 4K Hz	55 dB
Section width	50.500 in	Casing - 8K Hz	52 dB

Coil performance data is certified in accordance with AHRI standard 410. Propylene glycol and calcium chloride, or mixtures thereof, are not covered under the scope of AHRI 410.

Air-handling performance data is certified in accordance with AHRI standard 430. Air handlers with plenum fans and vertical draw-thru air handlers where the coil is mounted immediately below the fan section are not covered under the scope of AHRI 430.



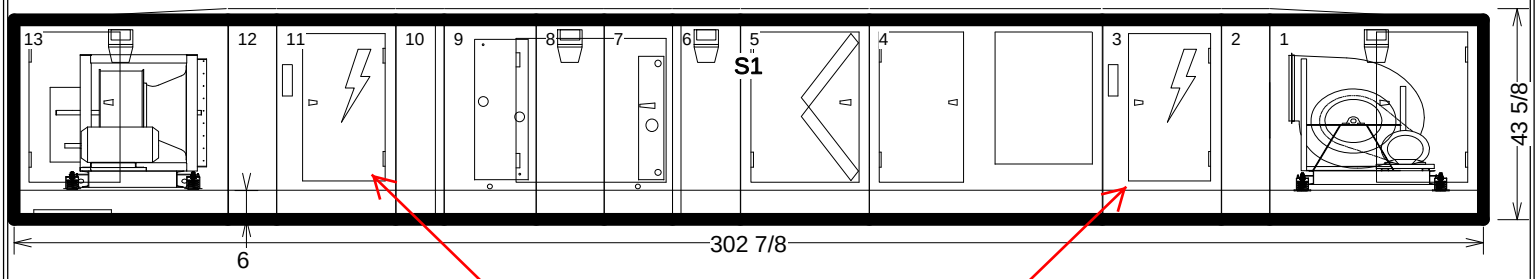
1 Plenum fan - 14in. belt-drive plenum, class 1 Supply fan 7.5 hp 460/3
2 Light switch and/or receptacle LH
3 Pipe cabinet right (3)
4 Cooling coil - 8 rows Coil type UW
5 Heating coil - 1 row Coil type NS
6 Outside air damper left 27.250 x 22.750
7 Return air damper left
8 Hood right
9 Housed fan - 10in. diameter FC, class 1 Return fan 3 hp 460/3
10 Fan inlet bottom 35.750 x 34.500
11 1" N.P.T.E
12 Opening bottom 16.000 x 24.000
13 Marine light (4)
14 Angled filters - Pleated media - MERV 8

Doors
19 width x 31 height
31 width x 30 height
10 width x 31 height
22 width x 31 height
17 width x 31 height
20 width x 31 height

For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length shown.

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 8	Job Name: Miller Remick VA Lebanon Bldg 101 and Bldg 22	Unit Casing: 2in Double Wall	TRANE® Performance Climate Changer™ Air Handlers
Product group: Outdoor unit	Actual airflow: 3200 cfm	Proposal Number:	
Integral base frame: 6in. integral base frame		Tags: AHU 22	
Paint: Factory painted - slate gray	Sales Office: Philadelphia Main Office	Rigging/Installed Weight: 3819.0 lb/ 4222.7 lb	



Overall Elevation View: Right - Shipping splits indicated by bold outline. - Measurements in inches

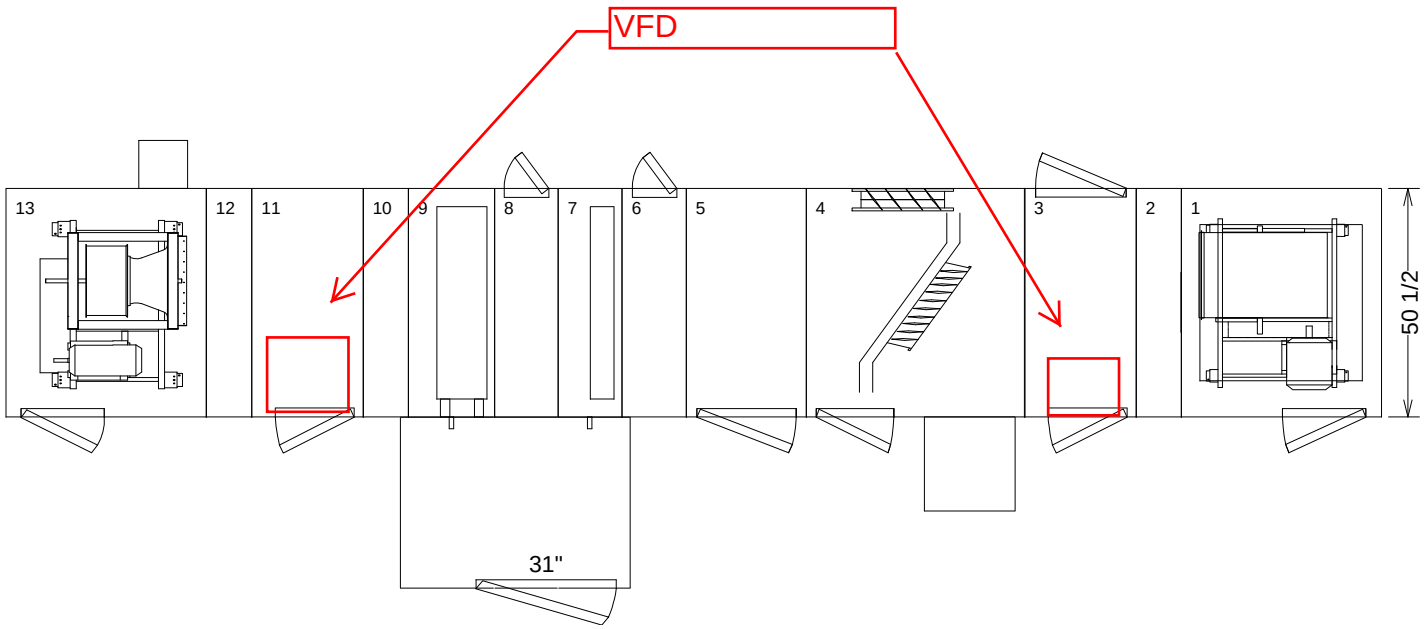
VFD

For maneuvering purposes, include 1.125 inches to each ship split length for overlapping panel flange. Flange will not add to overall installed unit length sh

Pos #	Module	Length	Weight
1	Fan section	44	673.65
2	Access section	10	83.78
3	Controls section	24 5/8	280.94
4	Economizer section	48 1/8	350.99
5	Filter section	26 1/2	236.75
6	Access section	14 1/8	113.32
7	Coil section	14 1/8	286.77
8	Access section	14	141.46
9	Coil section	19	469.77
10	Access section	10	83.78
11	Controls section	24 1/2	277.96
12	Access section	10 1/8	91.76
13	Fan section	44 1/8	787.63

Module	Weight
Roof Curb	344.15

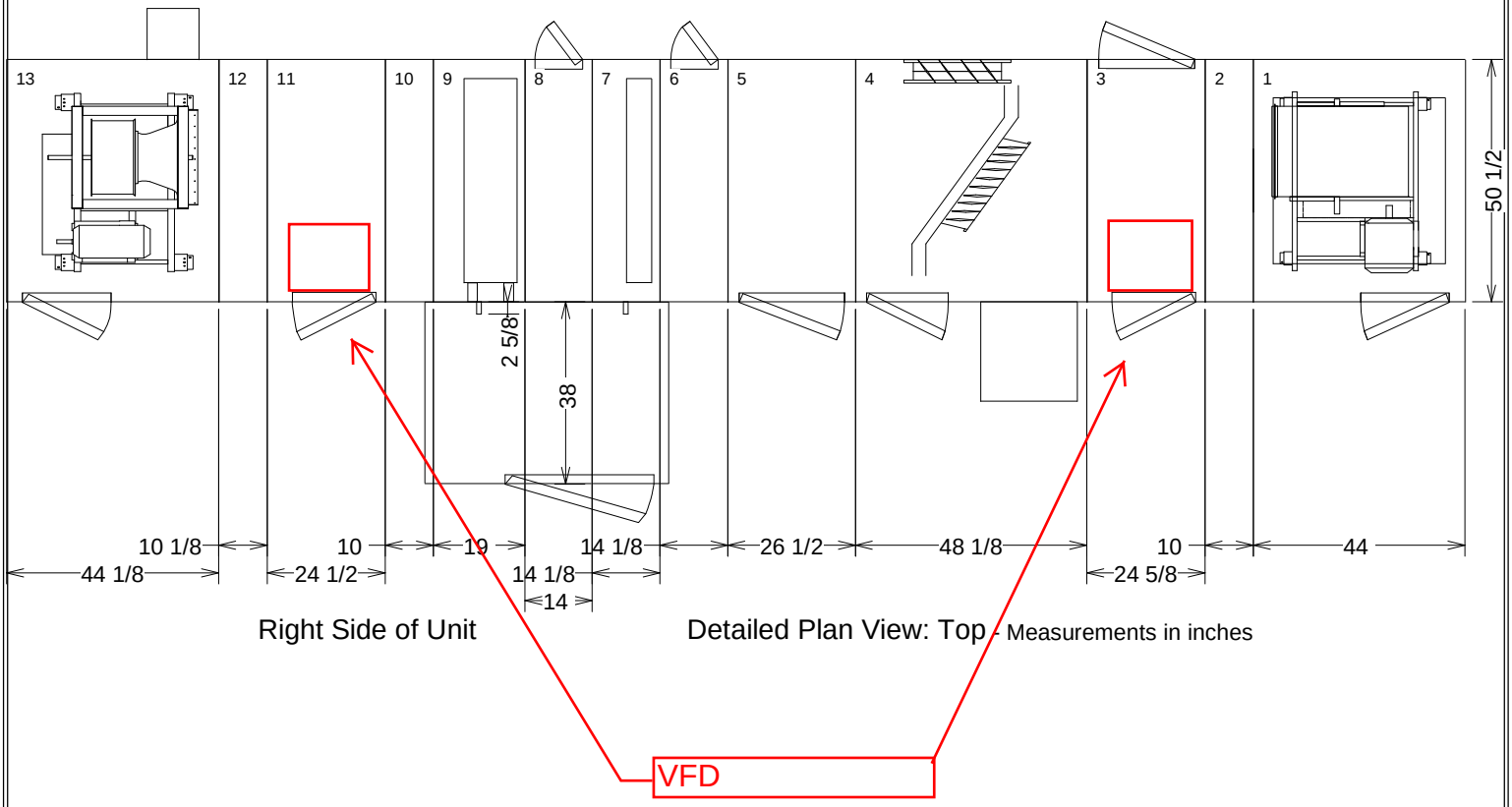
Installed Unit Weight 4222.70 lbs



Basic Overall Plan View: Top - Measurements in inches

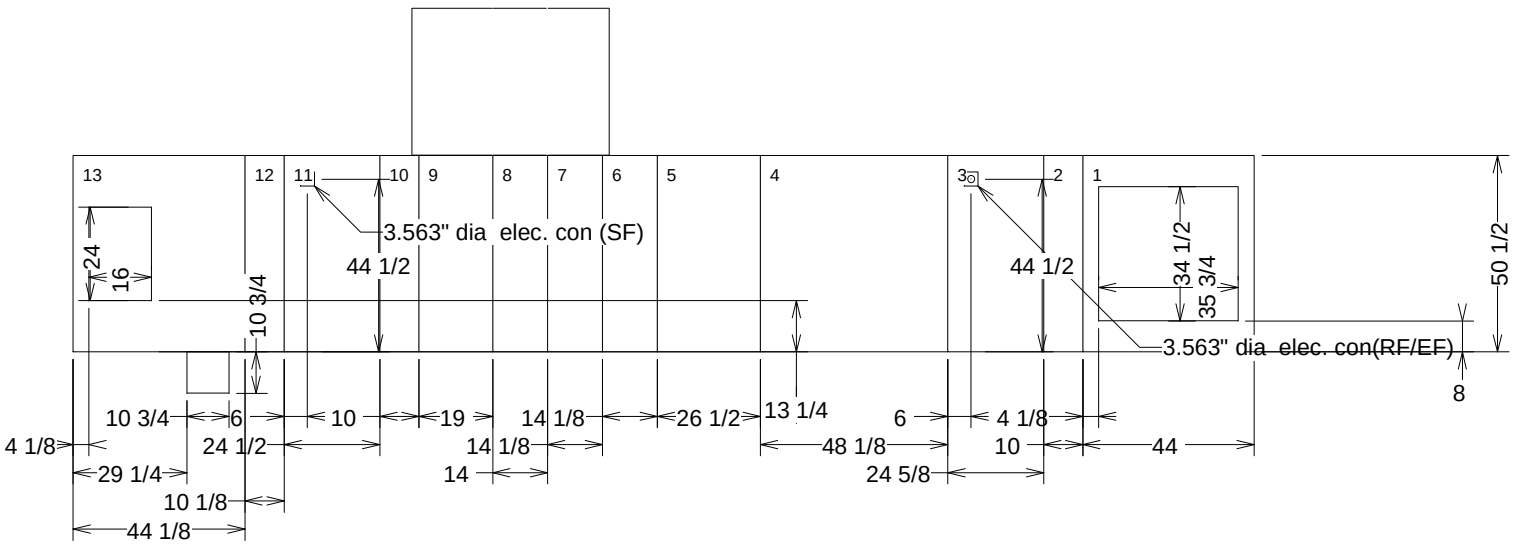
OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 8	Job Name: Miller Remick VA Lebanon Bldg 101 and Bldg 22	Unit Casing: 2in Double Wall	TRANE®
Product group: Outdoor unit	Actual airflow: 3200 cfm	Proposal Number:	Performance Climate Changer™ Air Handlers
Integral base frame: 6in. integral base frame		Tags: AHU 22	
Paint: Factory painted - slate gray	Sales Office: Philadelphia Main Office	Rigging/Installed Weight: 3819.0 lb/ 4222.7 lb	



Right Side of Unit

Detailed Plan View: Top - Measurements in inches

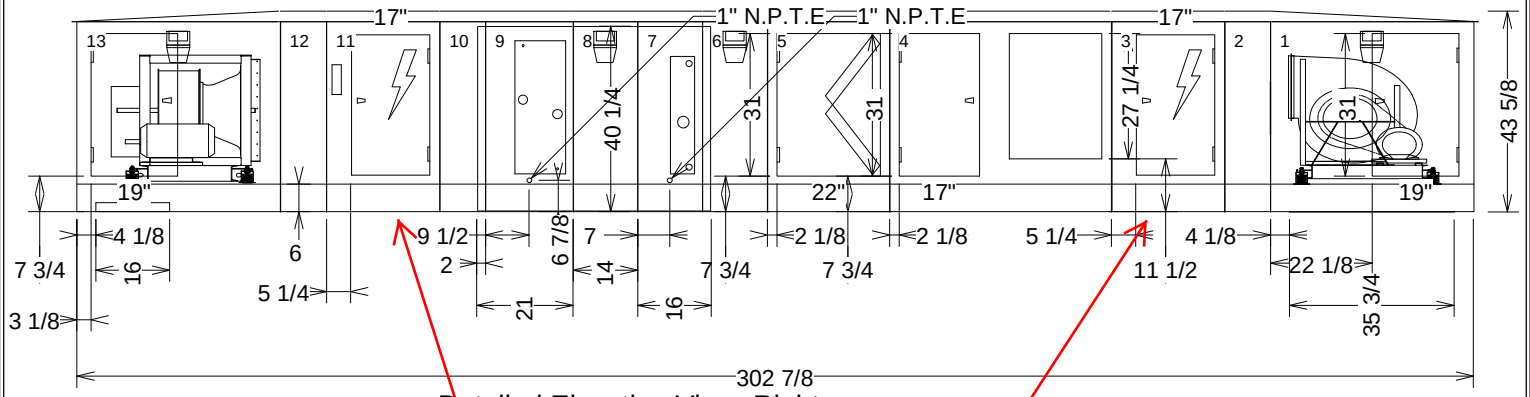


Left Side of Unit

Detailed Plan View: Bottom - Measurements in inches

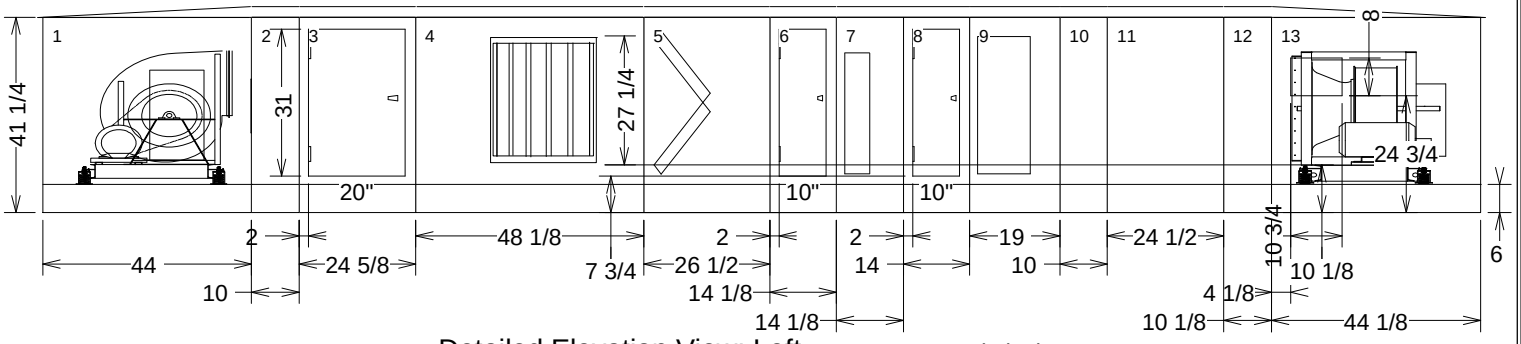
OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 8	Job Name: Miller Remick VA Lebanon Bldg 101 and Bldg 22	Unit Casing: 2in Double Wall	TRANE®
Product group: Outdoor unit	Actual airflow: 3200 cfm	Proposal Number:	Performance Climate Changer™ Air Handlers
Integral base frame: 6in. integral base frame		Tags: AHU 22	
Paint: Factory painted - slate gray	Sales Office: Philadelphia Main Office	Rigging/Installed Weight: 3819.0 lb/ 4222.7 lb	



Detailed Elevation View: Right - Measurements in inches

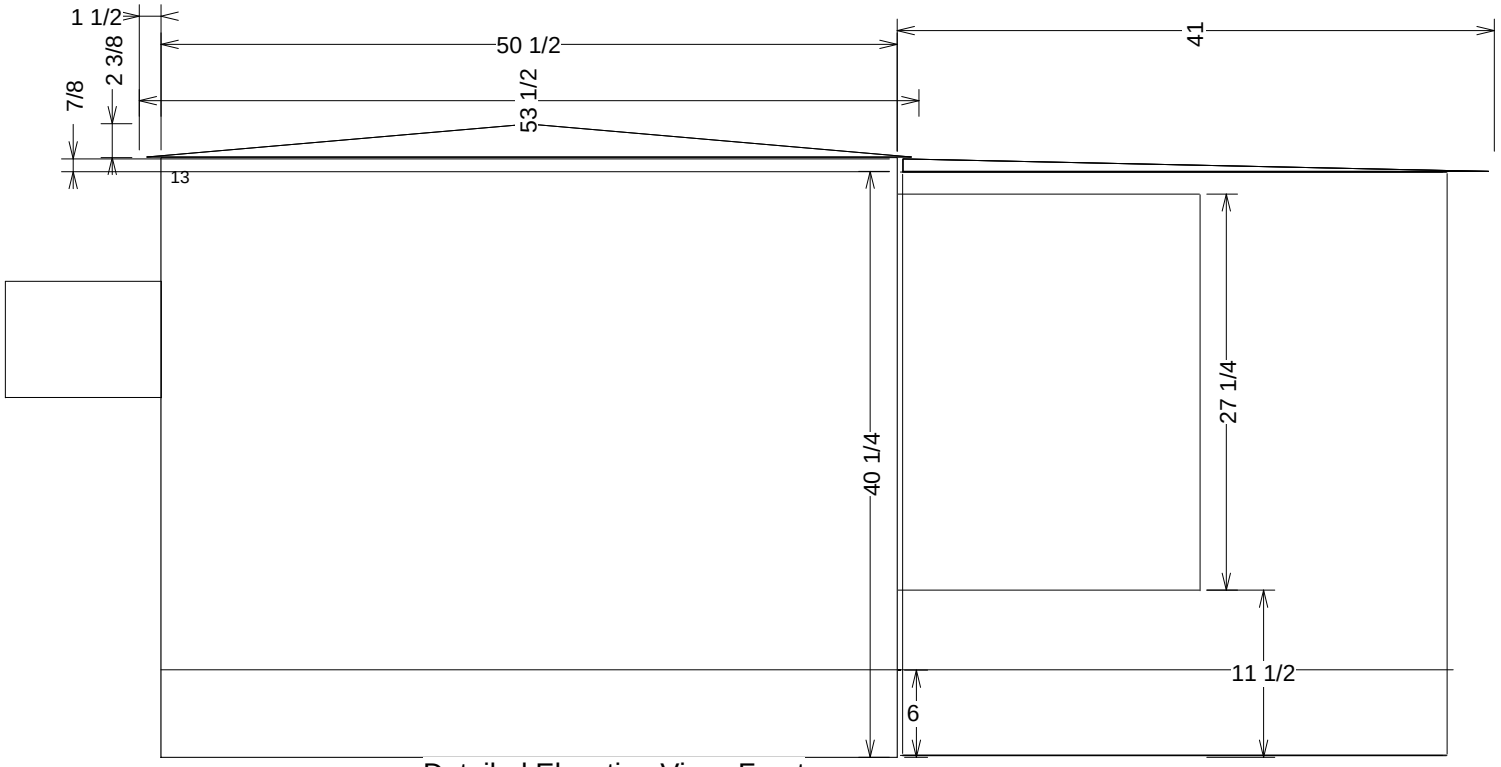
VFD



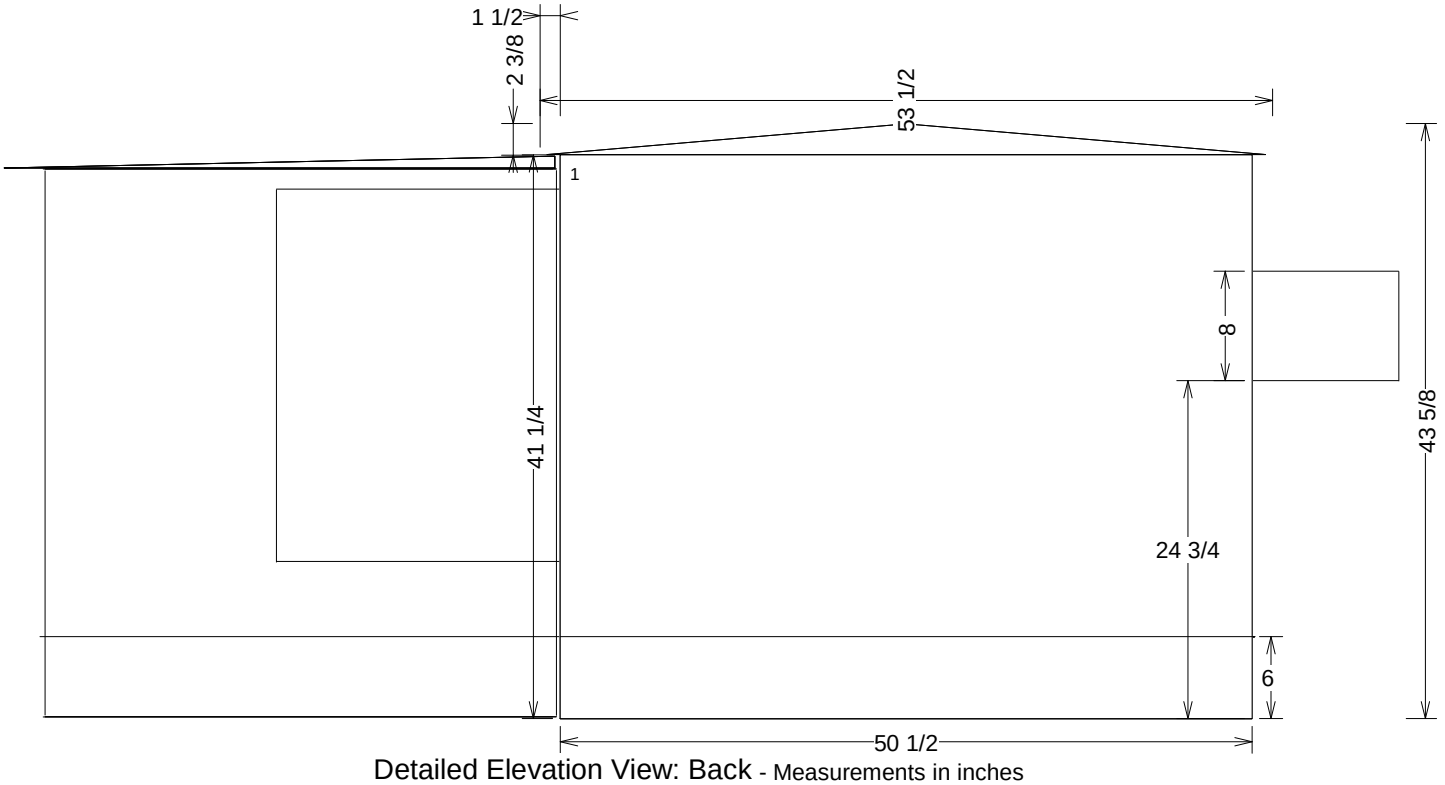
Detailed Elevation View: Left - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 8	Job Name: Miller Remick VA Lebanon Bldg 101 and Bldg 22	Unit Casing: 2in Double Wall	TRANE®
Product group: Outdoor unit	Actual airflow: 3200 cfm	Proposal Number:	Performance Climate Changer™
Integral base frame: 6in. integral base frame		Tags: AHU 22	Air Handlers
Paint: Factory painted - slate gray	Sales Office: Philadelphia Main Office	Rigging/Installed Weight: 3819.0 lb/ 4222.7 lb	



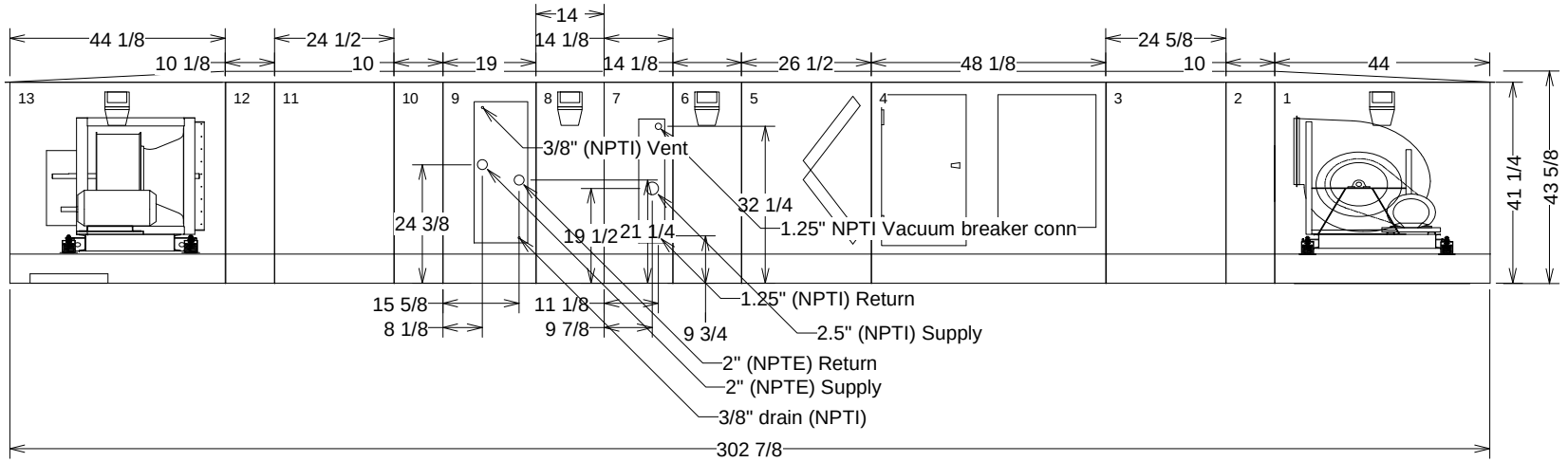
Detailed Elevation View: Front - Measurements in inches



Detailed Elevation View: Back - Measurements in inches

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 8	Job Name: Miller Remick VA Lebanon Bldg 101 and Bldg 22	Unit Casing: 2in Double Wall	TRANE®
Product group: Outdoor unit	Actual airflow: 3200 cfm	Proposal Number:	
Integral base frame: 6in. integral base frame		Tags: AHU 22	Performance Climate Changer™ Air Handlers
Paint: Factory painted - slate gray	Sales Office: Philadelphia Main Office	Rigging/Installed Weight: 3819.0 lb/ 4222.7 lb	

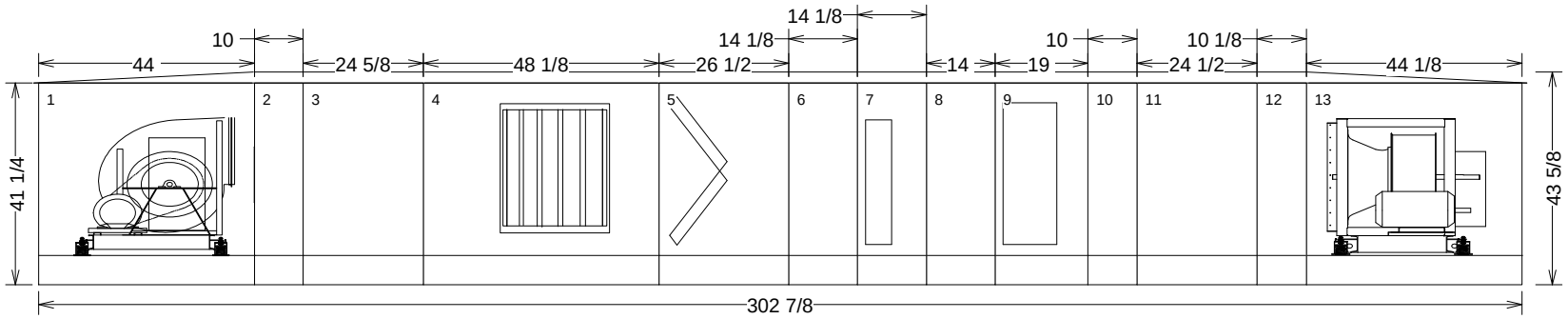


Coil connection view: Right - Measurements in inches

NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 8	Job Name: Miller Remick VA Lebanon Bldg 101 and Bldg 22	Unit Casing: 2in Double Wall	TRANE® Performance Climate Changer™ Air Handlers
Product group: Outdoor unit	Actual airflow: 3200 cfm	Proposal Number:	
Integral base frame: 6in. integral base frame		Tags: AHU 22	
Paint: Factory painted - slate gray	Sales Office: Philadelphia Main Office	Rigging/Installed Weight: 3819.0 lb/ 4222.7 lb	



Coil connection view: Left - Measurements in inches

NPTI : National Pipe Thread Internal Connection
NPTE : National Pipe Thread External Connection

OPENING AND DIMENSIONS MAY VARY FROM CONTRACT DOCUMENTS / RETURN OF APPROVED DRAWINGS CONSTITUTES ACCEPTANCE OF THESE VARIANCES / NOT TO SCALE

Unit size: 8	Job Name: Miller Remick VA Lebanon Bldg 101 and Bldg 22	Unit Casing: 2in Double Wall	TRANE® Performance Climate Changer™ Air Handlers
Product group: Outdoor unit	Actual airflow: 3200 cfm	Proposal Number:	
Integral base frame: 6in. integral base frame		Tags: AHU 22	
Paint: Factory painted - slate gray	Sales Office: Philadelphia Main Office	Rigging/Installed Weight: 3819.0 lb/ 4222.7 lb	

Basic Unit with Controls

Single/Dual Duct Terminals

ESV

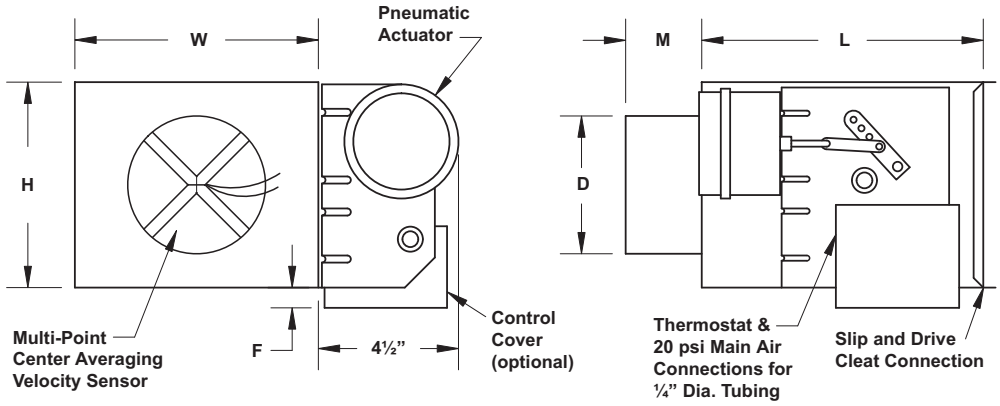
Available Models:

PESV	• Pneumatic
EESV	• Electric
AESV	• Analog Electronic
DESV	• Digital Electronic

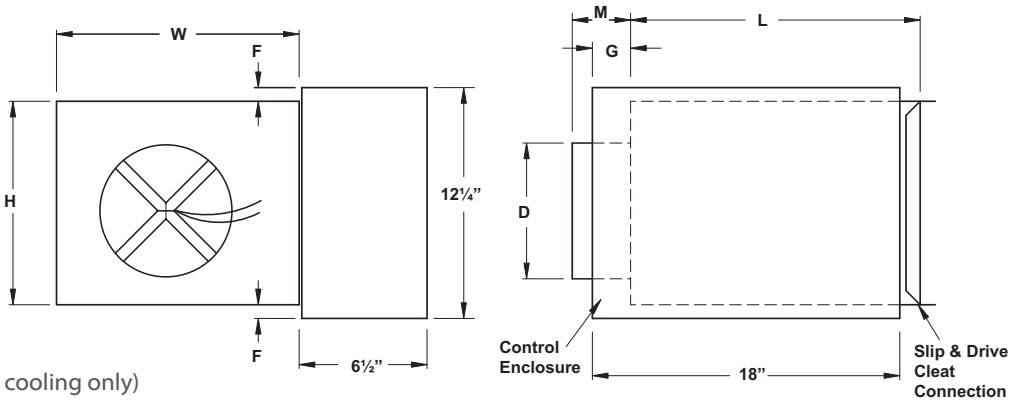
- Standard AeroCross™ multi-point center averaging velocity sensor (except EESV).
- Standard dual density insulation.
- Standard 22-gauge casing with slip and drive discharge connection.
- Controls supplied by Titus are factory calibrated for a quicker start-up.

ESV

PESV



DESV
AESV
EESV



(Optional for cooling only)

INLET SIZE	CFM RANGE	D	F		G	H	L	M	W
			PESV	AESV DESV EESV					
4	0-225	3⅞	1⅞	2⅛	7⅜	8	15½	5⅜	12
5	0-350	4⅞	1⅞	2⅛	7⅜	8	15½	5⅜	12
6	0-500	5⅞	1⅞	2⅛	7⅜	8	15½	3⅜	12
7	0-650	6⅞	⅞	1⅛	7⅜	10	15½	3⅜	12
8	0-900	7⅞	⅞	1⅛	7⅜	10	15½	3⅜	12
9	0-1050	8⅞	-	-	5⅜	12½	15½	3⅜	14
10	0-1400	9⅞	-	-	5⅜	12½	15½	3⅜	14
12	0-2000	11⅞	-	-	5⅜	15	15½	3⅜	16
14	0-3000	13⅞	-	-	3⅜	17½	15½	3⅜	20
16	0-4000	15⅞	-	-	3⅜	18	15½	3⅜	24
24X16	0-8000	23⅞ - 15⅞	⅞	1⅛	5⅜	18	15	3⅜	38

All dimensions are in inches.

INTEGRAL SOUND ATTENUATOR

Titus' unique integral design minimizes casing leakage and disturbance to airflow with no casing or insulation seams.

INTEGRAL ELECTRIC COIL

With a rigid one piece assembly, Titus locates the heating elements for optimal heat transfer and insets them for protection during shipment and installation.

STANDARD FEATURES:

- Primary automatic reset thermal cutout (one per coil).
- Secondary manual reset thermal cutout.
- Airflow switch (differential pressure).
- Derated nickel chrome heating elements.
- Magnetic or safety contactors (as required).
- Line terminal block.
- Control terminal block.
- ETL listed.
- 80/20 nickel chrome element wire.

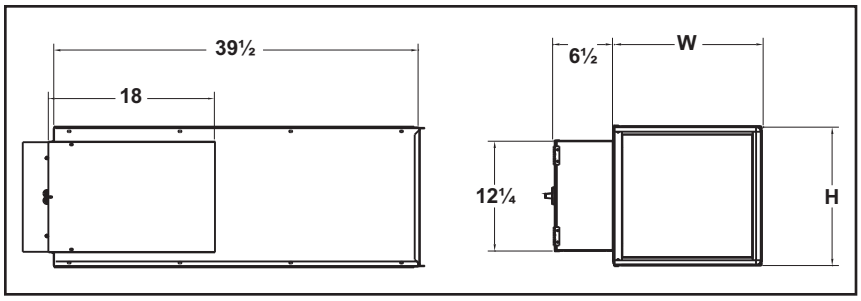
OPTIONAL FEATURES:

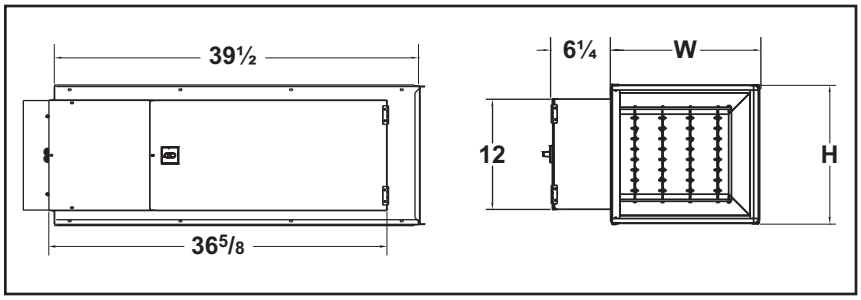
- Class ll, 24 volt control transformer.
- Mercury contactors.
- Door interlock disconnect switch.
- Main supply fuses.
- Dust tight construction.
- Removable flow sensor.

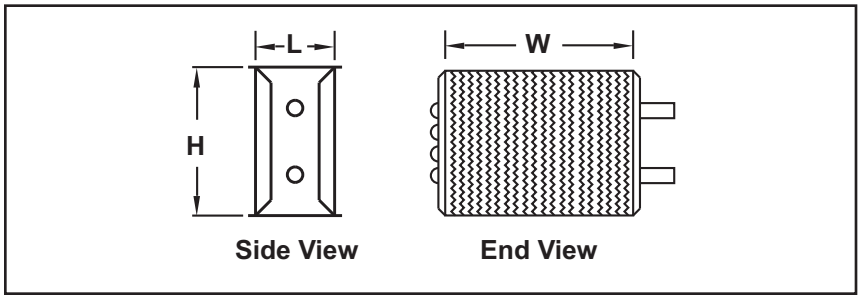
HOT WATER REHEAT COILS

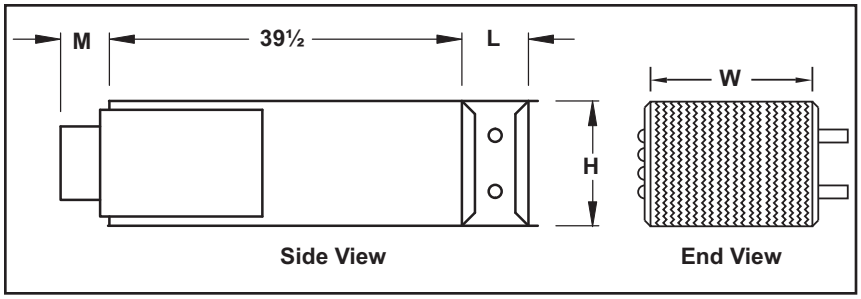
Details on water coil features are shown on performance pages M18-22.

INTEGRAL SOUND ATTENUATOR WITH OPTIONAL HOT WATER REHEAT COIL







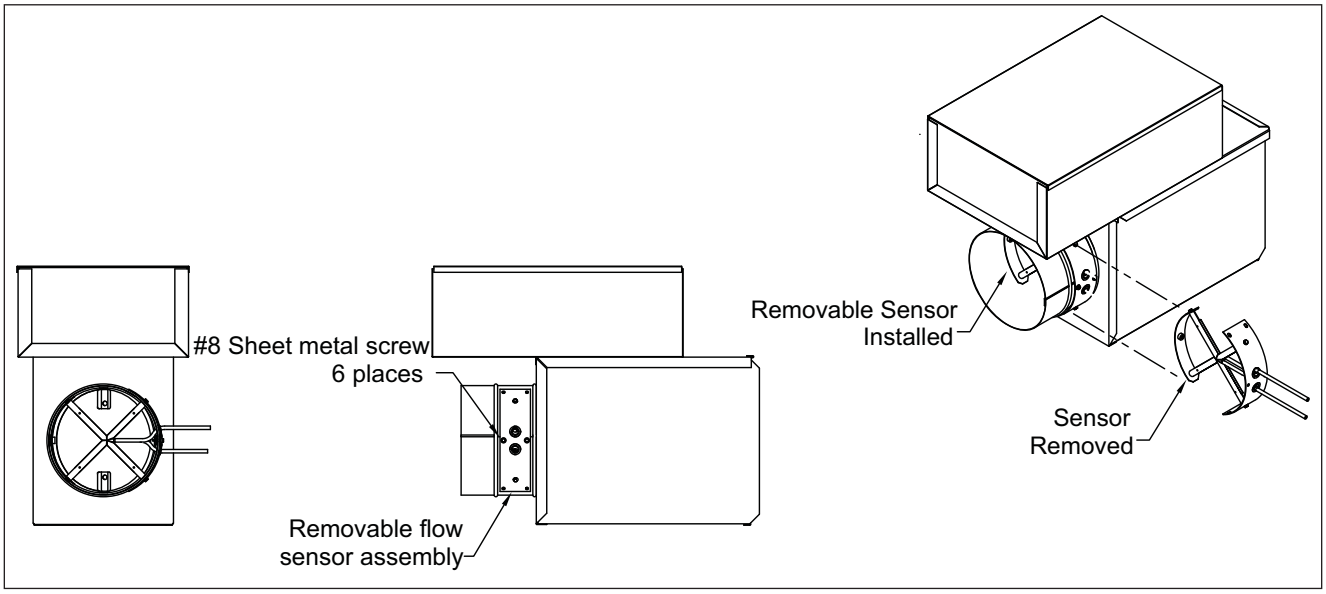


INLET SIZE	H	M	W	WATER COIL	
				L (1-2 ROW)	L (3-4 ROW)
4, 5	8	5⅜	12	5	7¼
6	8	3⅜	12	5	7¼
7, 8	10	3⅜	12	5	7¼
9, 10	12½	3⅜	14	5	7¼
12	15	3⅜	16	5	7¼
14	17½	3⅜	20	7½	9¾
16	18	3⅜	24	7½	9¾
24X16	18	3⅜	38	5	7¼

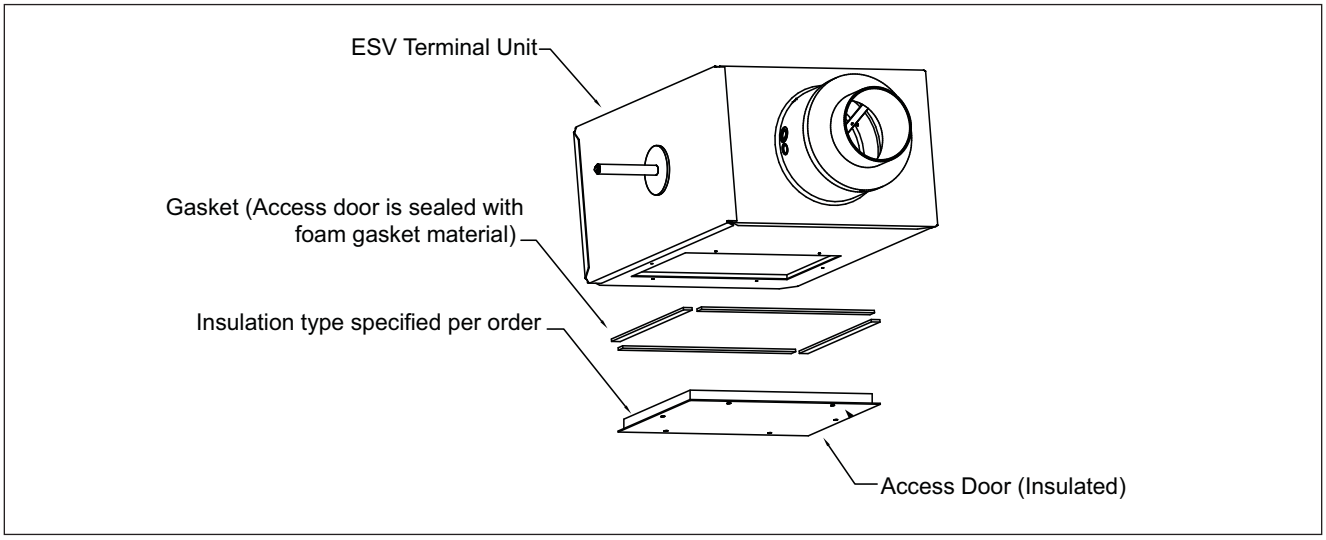
Note: The total length of the ESV basic unit and accessories (attenuators and coils) is the summation of basic unit length and the accessories length.

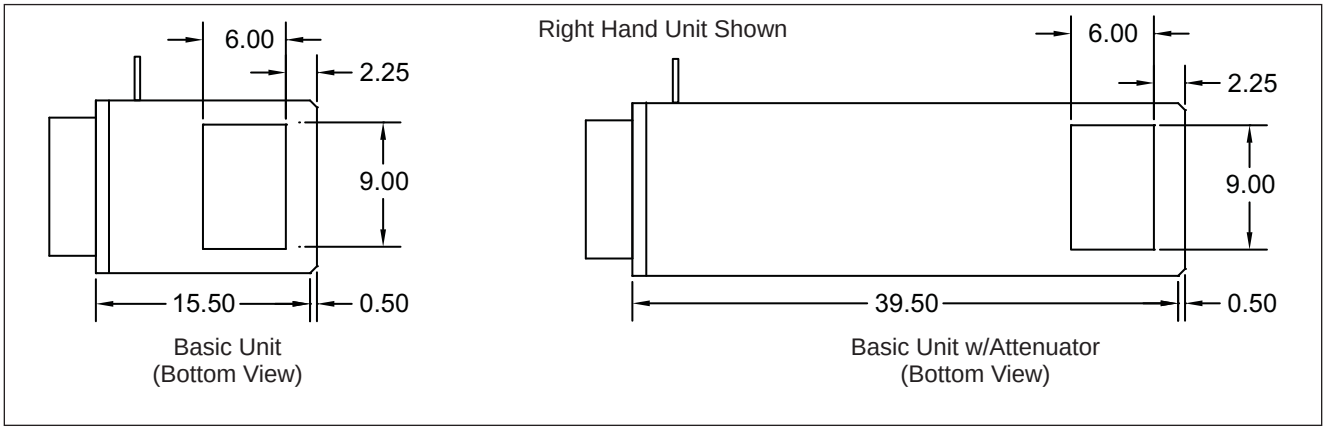
All dimensions are in inches.

REMOVABLE FLOW SENSOR



ESV WITH ACCESS DOOR OPTION





All dimensions are in inches.

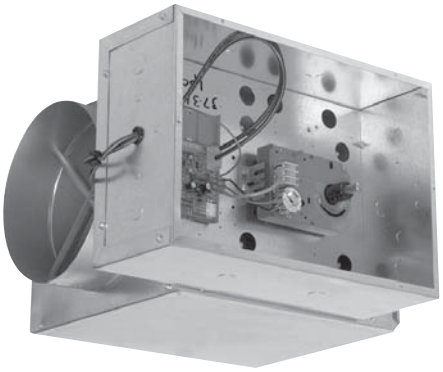
PERFORMANCE DATA

Single/Dual Duct Terminals

RECOMMENDED PRIMARY AIR CFM RANGES / ALL TERMINALS

Control Types:

PESV	**• Pneumatic**
AESV	**• Analog Electronic**
DESV	**• Digital Electronic**



AESV

QUICK SELECTION PROCEDURE

1. Select unit inlet size based upon acoustic parameters and/ or maximum pressure drop requirements, using pages M13.
2. Check inlet size selection against cfm control limits based on control type shown on this page.
3. Select accessories (multi-outlets, attenuators) as required.
4. Select reheat coil, if required. Make your selection using the actual heating flow rate, not cooling.

Inlet Size	Total cfm Range	cfm Ranges of Minimum and Maximum Settings							
		PESV - Pneumatic Titus II Controller		PESV - Pneumatic Titus I Controller		AESV - Analog Electronic TA1 Controller		DESV - Digital Typical Controller	
		Minimum	Maximum	Minimum	Maximum	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
4	0-225	45*-170	80-225	55*-170	80-225	45*-225	45-225	45*-225	45-225
5	0-350	65*-270	120-350	85*-270	120-350	65*-350	65-350	65*-350	65-350
6	0-500	80*-330	150-500	105*-330	150-500	80*-500	80-500	80*-500	80-500
7	0-650	105*-425	190-650	135*-425	190-650	105*-650	105-650	105*-650	105-650
8	0-900	145*-590	265-900	190*-590	265-900	145*-900	145-900	145*-900	145-900
9	0-1050	175*-700	315-1050	225*-700	315-1050	175*-1050	175-1050	175*-1050	175-1050
10	0-1400	230*-925	415-1400	300*-925	415-1400	230*-1400	230-1400	230*-1400	230-1400
12	0-2000	325*-1330	600-2000	425*-1330	600-2000	325*-2000	325-2000	325*-2000	325-2000
14	0-3000	450*-1800	810-3000	575*-1800	810-3000	450*-3000	450-3000	450*-3000	450-3000
16	0-4000	580*-2350	1100-4000	750*-2350	1100-4000	580*-4000	580-4000	580*-4000	580-4000
24X16	0-8000	1400*-5200	2600-8000	1800*-5200	2600-8000	1400*-7500	1400-7500	1400*-7500	1400-7500

*Factory cfm settings (except zero) will not be made below this range because control accuracy is reduced. On pressure dependent units, minimum cfm is always zero and there is no maximum.

Note: On controls mounted by Titus but supplied by others (FMA or Factory Mounting Authorization), these values are guidelines only. Controls mounted on an FMA basis are calibrated in the field.

PESV, AESV, DESV / RADIATED SOUND PERFORMANCE

Size	CFM	Min ΔPs	Octave Band Sound Power, Lw																									
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
4	100	0.02	49	45	36	33	31	26	11	52	48	39	36	35	31	15	53	50	41	37	37	34	17	55	51	43	38	39	36	18
	125	0.03	52	49	39	36	32	27	16	55	52	42	38	36	32	20	57	54	44	40	39	36	22	58	55	45	41	40	38	23
	150	0.04	55	52	41	37	34	28	20	58	55	44	40	38	34	23	60	57	46	41	40	37	25	61	58	47	42	42	39	27
	175	0.06	58	55	42	39	35	29	23	61	58	46	42	39	34	27	63	59	48	43	41	38	28	64	61	49	44	43	40	30
	200	0.08	60	57	44	40	36	30	25	63	60	47	43	40	35	29	65	62	49	44	42	38	31	66	63	51	45	44	41	33
5	150	0.01	49	44	36	32	31	25	10	53	49	41	36	35	30	16	55	51	43	38	37	33	18	57	53	45	39	39	35	21
	200	0.02	53	48	39	35	34	27	15	56	53	44	38	37	32	21	59	55	46	40	40	35	23	60	57	48	42	41	37	25
	250	0.03	55	52	41	37	35	29	20	59	56	46	40	39	34	24	62	59	49	42	41	37	28	63	61	51	44	43	39	30
	300	0.04	58	54	43	39	37	30	22	62	59	48	42	41	35	28	64	61	50	44	43	38	30	65	63	52	45	44	40	33
	350	0.06	60	56	45	40	38	31	24	63	61	49	43	42	36	30	66	63	52	45	44	39	33	67	65	54	47	45	41	35
6	300	0.07	55	49	40	35	32	28	16	59	54	45	39	37	33	22	61	57	48	41	39	36	25	63	59	50	42	41	38	28
	350	0.10	57	52	42	37	34	29	20	60	57	47	41	38	34	25	62	59	50	43	40	37	28	64	62	52	44	42	39	31
	400	0.13	58	53	44	39	35	30	21	61	58	49	42	39	35	27	63	61	52	44	42	38	30	65	63	54	46	43	40	33
	450	0.16	59	55	45	40	36	31	23	62	60	50	44	40	36	29	64	63	53	46	43	39	33	66	65	55	47	45	41	35
	500	0.20	59	56	47	42	37	32	24	63	61	51	45	41	37	30	65	64	54	47	44	40	34	67	67	56	49	46	42	37
7	450	0.07	59	48	42	38	33	24	20	61	54	48	42	38	30	23	62	57	51	45	41	33	25	63	59	53	46	43	35	28
	500	0.09	60	50	43	39	34	24	22	62	55	49	43	39	30	24	63	58	52	46	42	34	27	64	60	54	48	44	36	29
	550	0.10	60	51	44	40	35	25	22	63	57	50	45	40	31	25	64	59	53	47	43	34	28	66	62	55	49	45	37	31
	600	0.12	61	53	45	42	35	25	23	63	58	51	46	41	31	27	65	61	54	48	44	35	30	66	63	56	50	46	37	33
	650	0.15	62	54	46	43	36	26	24	64	59	52	47	41	32	28	65	62	55	49	44	35	31	66	64	57	51	46	38	34
8	600	0.02	59	50	44	40	38	32	20	62	55	49	43	43	39	24	64	58	52	46	45	44	27	65	60	54	47	47	47	29
	650	0.02	60	51	44	41	39	32	22	63	56	50	44	44	40	25	65	59	53	47	46	45	28	66	61	55	48	48	48	30
	700	0.02	60	52	45	42	40	33	22	63	57	50	45	44	41	25	65	60	53	47	47	45	29	67	62	56	49	49	48	31
	750	0.02	61	53	46	43	40	34	23	64	58	51	46	45	41	27	66	61	54	48	48	46	30	67	63	56	50	50	49	33
	800	0.03	62	54	47	43	41	34	24	65	59	52	47	46	42	28	66	62	55	49	48	47	31	68	64	57	51	50	50	34
9	800	0.04	58	47	43	36	34	30	19	61	53	49	42	40	35	23	62	57	52	46	44	38	26	63	59	55	48	47	40	29
	850	0.04	58	48	43	37	34	31	19	61	54	49	43	41	35	23	63	58	53	46	45	38	27	64	60	55	49	47	40	29
	900	0.05	59	49	44	37	35	31	20	62	55	50	43	41	35	24	64	58	53	47	45	38	27	65	61	56	49	48	40	30
	950	0.06	59	50	44	37	35	31	20	62	56	50	43	42	36	24	64	59	54	47	45	38	28	65	62	56	49	48	40	31
	1000	0.06	60	50	44	38	36	31	22	63	56	50	44	42	36	25	65	60	54	47	46	39	29	66	62	57	50	48	40	31
10	900	0.01	60	50	47	45	42	29	22	63	57	53	50	48	37	27	65	60	57	53	52	41	31	67	63	59	56	54	44	34
	1000	0.01	60	51	48	46	43	30	22	64	58	54	51	49	38	28	66	61	57	54	53	42	31	67	64	59	56	55	45	34
	1100	0.01	61	52	48	47	44	32	23	65	58	54	52	50	39	28	67	62	57	55	54	43	31	68	64	60	57	56	46	35
	1200	0.01	62	53	48	47	45	32	24	65	59	54	53	51	40	28	67	63	58	56	55	44	33	69	65	60	58	57	47	35
	1300	0.01	63	54	49	48	45	33	25	66	60	55	53	52	41	29	68	63	58	56	55	45	33	69	66	61	58	58	48	36
12	1200	0.01	58	50	47	41	37	30	20	62	56	52	47	43	37	26	64	59	56	50	46	41	30	66	61	58	53	49	43	32
	1400	0.01	60	52	48	42	38	32	22	63	57	54	48	45	39	28	65	60	57	52	48	42	31	67	63	60	54	51	45	35
	1600	0.01	61	53	50	43	40	34	24	64	59	55	49	46	40	29	66	62	59	53	50	44	34	68	64	61	55	52	47	36
	1800	0.01	61	55	51	44	41	35	25	65	60	56	50	48	41	30	67	63	60	54	51	45	35	69	65	62	56	54	48	37
	2000	0.01	62	56	52	45	43	36	26	66	61	57	51	49	43	31	68	64	61	55	52	47	36	69	67	63	57	55	49	38
14	1500	0.02	56	51	45	43	40	36	18	60	56	50	48	45	41	24	62	59	53	51	48	45	28	64	61	55	53	50	47	30
	1800	0.03	58	53	46	44	41	36	21	62	58	51	49	46	42	27	64	60	54	52	49	45	29	66	63	56	54	51	48	33
	2100	0.04	59	54	47	45	42	37	22	63	59	52	50	47	43	28	66	62	55	53	50	46	31	67	64	58	55	52	49	34
	2400	0.05	60	55	48	46	43	38	23	64	60	53	51	48	43	29	67	63	56	54	51	47	33	69	65	58	56	53	49	35
	2700	0.06	62	56	49	47	44	38	24	66	61	54	52	49	44	30	68	64	57	55	52	47	34	70	66	59	57	54	50	36
16	2000	0.02	55	48	43	41	39	31	36	59	53	47	45	44	38	21	61	56	50	47	47	41	24	63	58	52	49	49	44	27
	2400	0.02	57	51	45	43	41	33	18	61	56	49	47	46	39	24	64	59	52	49	49	43	28	65	61	54	51	51	46	30
	2800	0.03	59	53	46	44	42	34	21	63	58	51	48	47	41	27	66	61	54	50	50	45	30	67	63	55	52	52	48	33
	3200	0.04	61	55	48	46	44	36	23	65	60	52	50	49	42	29	67	62	55	52	52	46	31	69	64	57	53	54	49	34
	3600	0.05	62	56	49	47	45	37	24	66	61	54	51	50	44	30	69	64	56	53	53	48	34	71	66	58	55	55	50	36
40	3900	0.03	70	65	63	59	57	54	38	72	68	66	62	61	58	41	74	69	67	63	63	61	42	75	70	68	64	65	63	43
	4600	0.04	73	68	66	62	59	55	41	75	71	68	64	63	60	43	77	72	70	66	65	63	46	78	73	71	67	67	64	47
	5300	0.06	75	71	68	64	61	56	43	78	73	71	66	65	61	47	79	74	72	68	67	64	48	80	75	73	69	68	66	49
	6000	0.07	77	73	71	66	63	57	47	80	75	73	68	66	62	49	81	76	74	70	68	65	50	82	77	75	71	70	67	51
	6700	0.09	79	75	72	67	64	58	48	82	77	75	70	68	63	51	83	78	76	71	70	66	52	84	79	77	72	71	68	53

- Radiated sound is the noise transmitted through the unit casing.
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open.
- Sound power levels are in dB, ref 10^{-12} watts.
- Sound performance based on units lined with standard dual density fiberglass lining.
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2008.
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10.
- Only highlighted data points are AHRI certified. See page M24 for AHRI Certified Performance Listings.

PESV, AESV, DESV / DISCHARGE SOUND PERFORMANCE

Size	CFM	Min ΔPs	Octave Band Sound Power, Lw																									
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
4	100	0.02	62	53	46	42	40	33	17	63	56	50	46	47	41	18	64	58	53	49	50	46	19	65	59	55	51	53	49	20
	125	0.03	64	57	49	44	42	35	19	65	60	53	49	49	43	20	66	61	56	52	52	47	22	67	62	58	54	55	51	23
	150	0.04	65	60	51	47	44	36	20	67	62	56	51	50	44	23	68	64	59	54	54	49	24	68	65	60	56	57	52	24
	175	0.06	67	62	53	48	45	37	23	68	65	58	53	51	45	24	69	66	61	56	55	50	25	70	68	63	58	58	53	28
	200	0.08	68	64	55	50	46	38	24	69	67	60	55	53	46	27	70	69	62	58	56	51	29	71	70	64	60	59	54	30
5	150	0.01	60	50	46	43	41	34	14	62	55	51	47	47	42	17	64	57	54	50	51	46	19	65	59	57	52	53	49	20
	200	0.02	63	54	49	46	43	36	18	65	58	55	51	49	44	20	67	61	58	53	53	48	23	68	63	60	55	55	51	24
	250	0.03	65	57	52	49	45	38	20	67	62	57	53	51	45	23	69	64	60	56	55	50	25	70	66	62	58	57	53	27
	300	0.04	66	59	54	51	47	39	18	69	64	59	55	53	46	22	70	67	62	58	56	51	25	71	69	65	60	59	54	28
	350	0.06	68	61	56	52	48	40	20	70	66	61	57	54	47	24	72	69	64	60	57	52	28	73	71	66	61	60	55	30
6	300	0.07	60	57	53	50	45	39	14	64	62	58	54	51	46	20	67	65	61	57	54	50	23	69	67	63	58	56	53	25
	350	0.10	61	59	54	52	47	40	16	66	64	60	56	52	47	22	68	67	63	59	55	51	25	70	69	65	60	58	54	28
	400	0.13	63	60	56	54	48	41	17	67	66	61	58	53	48	24	70	69	64	60	57	52	28	71	71	66	62	59	55	30
	450	0.16	64	62	57	55	49	42	20	68	67	63	59	54	49	25	71	70	66	62	58	53	29	73	73	68	63	60	56	33
	500	0.20	65	63	59	56	50	43	21	69	69	64	61	55	50	28	72	72	67	63	59	54	31	74	74	69	65	61	57	34
7	450	0.07	64	58	53	51	47	40	15	67	63	58	54	51	46	21	68	67	60	56	54	49	25	70	69	62	58	56	52	28
	500	0.09	64	59	54	52	48	40	16	67	65	59	56	52	47	23	69	68	62	58	55	50	27	70	71	63	59	57	53	30
	550	0.1	65	61	55	54	49	41	18	68	66	60	57	53	48	24	69	70	63	59	56	51	29	71	72	64	60	58	54	31
	600	0.12	65	62	56	55	49	42	20	68	67	61	58	54	48	25	70	71	63	60	57	52	30	71	73	65	61	59	55	33
	650	0.15	65	63	57	56	50	43	21	68	69	62	59	55	49	28	70	72	64	61	58	53	31	72	74	66	62	59	55	34
8	600	0.02	66	60	55	52	48	40	18	69	66	59	55	52	47	24	71	69	61	56	55	51	28	72	72	63	57	57	54	31
	650	0.02	67	61	56	53	48	41	19	70	67	60	56	53	47	25	71	70	62	57	55	51	29	72	73	64	58	57	54	33
	700	0.02	67	62	56	54	49	41	20	70	68	60	56	53	48	27	72	71	63	58	56	52	30	73	74	64	59	58	55	34
	750	0.02	68	63	57	54	49	42	20	70	69	61	57	54	48	27	72	72	63	58	56	52	30	73	75	65	60	58	55	34
	800	0.03	68	64	57	55	50	42	21	71	70	62	58	54	49	28	72	73	64	59	57	53	31	74	75	66	60	59	56	34
9	800	0.04	67	59	56	53	49	43	17	70	64	60	57	54	49	21	71	67	62	59	57	53	24	72	69	64	60	59	56	27
	850	0.04	68	60	56	53	49	43	18	70	65	60	57	54	50	22	72	68	62	59	57	54	25	73	70	64	61	59	56	28
	900	0.05	68	61	57	54	50	43	18	71	66	61	57	55	50	23	73	68	63	59	57	54	25	74	70	65	61	59	57	28
	950	0.06	69	61	57	54	50	44	19	72	66	61	58	55	50	23	73	69	63	60	58	54	27	74	71	65	61	60	57	29
	1000	0.06	69	62	58	55	50	44	19	72	67	61	58	55	50	24	74	70	64	60	58	54	28	75	72	65	62	60	57	30
10	900	0.01	69	60	57	55	50	44	19	71	65	61	59	55	50	22	72	68	64	61	58	54	25	73	71	66	63	61	57	29
	1000	0.01	70	61	58	56	50	44	20	72	66	62	60	56	51	23	73	69	65	62	59	55	27	74	72	67	64	61	57	30
	1100	0.01	70	61	58	57	51	45	20	73	67	63	61	56	51	24	74	70	65	63	60	55	28	75	72	67	65	62	58	30
	1200	0.01	71	62	59	57	52	45	22	73	68	63	61	57	52	25	75	71	66	64	60	56	29	76	73	68	66	63	59	31
	1300	0.01	72	63	60	58	52	46	23	74	68	64	62	58	53	25	75	72	67	65	61	56	30	76	74	68	66	63	59	33
12	1200	0.01	68	62	59	55	53	46	18	71	67	63	59	57	52	24	73	70	65	62	60	56	28	74	72	67	64	62	59	30
	1400	0.01	69	63	61	56	54	47	20	72	69	65	61	59	53	27	74	72	67	63	61	57	30	75	74	69	65	63	60	33
	1600	0.01	70	64	62	57	55	48	21	73	70	66	62	59	55	28	75	73	68	64	62	58	31	76	75	70	66	64	61	34
	1800	0.01	71	66	63	58	55	49	23	74	71	67	63	60	56	29	75	74	70	65	63	59	33	76	76	71	67	65	62	35
	2000	0.01	71	67	64	59	56	50	24	74	72	68	64	61	56	30	76	75	71	66	64	60	34	77	77	72	68	66	63	36
14	1500	0.02	65	56	56	53	50	44	14	68	62	61	59	57	53	18	70	66	63	62	62	59	23	72	68	65	65	65	62	25
	1800	0.03	66	58	58	53	50	44	15	69	64	62	59	58	53	21	71	67	65	63	62	59	24	73	70	67	65	65	63	28
	2100	0.04	67	59	59	54	51	44	17	70	65	64	60	58	54	22	72	68	66	63	63	59	25	74	71	68	66	66	63	29
	2400	0.05	68	60	60	54	51	44	18	71	66	65	60	59	54	23	73	69	68	64	63	59	27	74	72	69	66	66	63	30
	2700	0.06	68	61	61	54	51	45	18	72	67	66	61	59	54	24	74	70	69	64	63	60	28	75	73	70	67	66	63	31
16	2000	0.02	65	58	57	54	52	45	14	68	62	60	58	56	51	18	70	65	62	61	59	54	22	71	67	63	63	61	57	24
	2400	0.02	67	61	59	55	53	46	17	70	65	63	60	58	52	22	72	67	64	62	61	56	24	73	69	66	64	62	58	27
	2800	0.03	68	63	61	57	55	48	20	72	67	65	61	59	54	24	74	69	66	64	62	57	27	75	71	68	66	64	60	29
	3200	0.04	70	64	63	58	56	49	21	73	68	66	62	60	55	25	75	71	68	65	63	59	29	76	72	70	67	65	61	30
	3600	0.05	71	66	65	59	57	50	23	74	70	68	63	61	56	28	76	72	70	66	64	60	30	78	74	71	68	66	62	33
40	3900	0.03	74	69	66	62	61	56	27	79	74	71	67	67	62	33	82	77	74	69	70	66	36	84	79	76	71	72	68	34
	4600	0.04	75	70	67	63	63	58	28	80	76	73	68	68	64	35	83	79	76	71	71	67	38	86	81	78	73	74	70	41
	5300	0.06	77	72	69	65	64	60	30	82	77	74	69	70	65	36	85	80	77	72	73	69	40	87	82	79	74	75	71	42
	6000	0.07	78	73	70	66	65	61	31	83	78	75	71	71	67	37	86	81	78	73	74	70	41	88	83	80	75	76	73	43
	6700	0.09	79	74	71	67	67	62	33	84	79	76	72	72	68	38	87	82	79	74	75	71	42	89	84	81	76	77	74	45

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork.
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open.
- Sound power levels are in dB, ref 10^{-12} watts.
- Sound performance based on units lined with standard dual density fiberglass lining.
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2008.
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10.
- Only highlighted data points are AHRI certified. See page M24 for AHRI Certified Performance Listings.

PESV, AESV, DESV / HOT WATER COIL CAPACITY, MBH / 1- AND 2-ROW

	Rows/ Circuits	gpm	Head Loss	Airflow, cfm								
Sizes 4-5-6				50	100	150	200	250	300	350	400	450
	One-Row Single Circuit	1.0	0.50	4.2	5.9	7.0	7.7	8.6	9.4	10.1	10.6	11.2
		2.0	1.69	4.4	6.3	7.5	8.3	9.4	10.3	11.1	11.8	12.5
		4.0	5.77	4.4	6.5	7.8	8.7	9.8	10.9	11.8	12.6	13.4
		5.0	8.59	4.5	6.5	7.8	8.8	9.9	11.0	11.9	12.8	13.6
		Airside Δ Ps		0.01	0.01	0.02	0.03	0.05	0.07	0.09	0.12	0.14
	Two-Row Multi-Circuit	1.0	0.24	5.3	8.6	11.0	12.9	14.4	15.6	16.7	17.6	18.4
		3.0	1.66	5.5	9.4	12.5	15.0	17.1	19.0	20.7	22.2	23.5
		5.0	4.06	5.6	9.6	12.8	15.5	17.9	19.9	21.8	23.5	25.0
		7.0	7.39	5.6	9.7	13.0	15.8	18.2	20.4	22.3	24.1	25.7
		Airside ΔPs		0.01	0.02	0.04	0.07	0.10	0.13	0.18	0.22	0.27
	Rows/ Circuits	gpm	Head Loss	Airflow, cfm								
Sizes 7-8				100	200	300	400	500	600	700	800	900
	One-Row Single Circuit	1.0	0.69	6.9	9.2	10.7	12.2	13.4	14.5	15.3	16.1	16.8
		2.0	2.34	7.2	9.9	11.7	13.6	15.1	16.4	17.6	18.6	19.5
		3.0	4.77	7.4	10.2	12.1	14.1	15.8	17.2	18.5	19.6	20.7
		4.0	7.96	7.4	10.3	12.3	14.4	16.1	17.7	19.0	20.2	21.3
		Airside ΔPs		0.01	0.02	0.04	0.07	0.10	0.14	0.19	0.24	0.30
	Two-Row Multi-Circuit	1.0	0.33	9.4	14.3	17.6	20.1	21.9	23.4	24.7	25.7	26.6
		3.0	2.32	10.1	16.5	21.2	25.0	28.1	30.8	33.1	35.1	37.0
		5.0	5.66	10.3	17.0	22.2	26.3	29.9	32.9	35.6	38.0	40.2
		7.0	10.28	10.3	17.2	22.6	27.0	30.7	34.0	36.9	39.5	41.8
		Airside ΔPs		0.01	0.04	0.08	0.13	0.20	0.27	0.36	0.46	0.56
	Rows/ Circuits	gpm	Head Loss	Airflow, cfm								
Sizes 9-10				200	300	400	500	600	700	800	900	1000
	One-Row Multi-Circuit	2.0	0.68	11.7	13.8	15.3	17.0	18.5	19.8	21.0	22.0	23.0
		3.0	1.40	12.1	14.4	16.0	18.0	19.7	21.2	22.5	23.7	24.8
		5.0	3.41	12.5	15.0	16.7	18.9	20.8	22.4	23.9	25.3	26.6
		6.0	4.72	12.6	15.1	16.9	19.1	21.1	22.8	24.3	25.8	27.1
		Airside ΔPs		0.01	0.02	0.04	0.05	0.07	0.10	0.12	0.15	0.18
	Two-Row Multi-Circuit	2.0	0.65	17.4	22.4	26.3	29.5	32.1	34.4	36.3	38.1	39.6
		4.0	2.19	18.5	24.3	29.0	33.0	36.5	39.6	42.3	44.7	46.9
		6.0	4.43	18.8	25.0	30.1	34.5	38.3	41.7	44.8	47.6	50.1
		8.0	7.35	19.0	25.4	30.7	35.3	39.3	42.9	46.2	49.2	51.9
		Airside ΔPs		0.02	0.04	0.07	0.10	0.14	0.18	0.23	0.29	0.35
	Rows/ Circuits	gpm	Head Loss	Airflow, cfm								
Size 12				300	500	700	900	1100	1300	1500	1700	1900
	One-Row Multi-Circuit	2.0	0.88	14.7	17.3	19.6	21.4	22.9	24.1	25.2	26.0	26.8
		3.0	1.81	16.4	19.9	23.0	25.7	28.0	29.9	31.5	32.9	34.2
		5.0	4.40	17.5	21.6	25.4	28.7	31.6	34.0	36.2	38.1	39.9
		6.0	6.08	17.9	22.3	26.3	29.9	33.0	35.8	38.2	40.3	42.3
		Airside ΔPs		0.01	0.03	0.06	0.09	0.12	0.17	0.21	0.27	0.33
	Two-Row Multi-Circuit	2.0	0.84	21.7	27.5	31.1	33.7	35.6	37.1	38.3	39.3	40.2
		4.0	2.79	26.0	35.7	42.8	48.5	53.0	56.9	60.2	63.1	65.6
		6.0	5.63	27.1	37.9	46.3	53.0	58.7	63.6	67.8	71.6	75.0
		8.0	9.33	27.6	39.0	47.9	55.3	61.6	67.0	71.8	76.1	79.9
		Airside ΔPs		0.02	0.06	0.11	0.16	0.23	0.32	0.41	0.51	0.62

For performance notes, see the next page.

SELECTION AND CAPACITIES

Recommended Coil Selection Data

The table at the right describes the maximum recommended kW capacities and number of stages available for Titus single duct terminals.

To make a coil selection:

1. Check the desired kW is available in desired unit size and number of stages. (Required to prevent excessive watt density and current draw, while taking into account unit size limitations.)
2. Check the desired minimum airflow limit is within recommended operating range. (Ensures velocity pressure will be sufficient to close airflow sensing switch.)
3. Multiply desired minimum airflow limit by a factor of 0.0142 and check the result is equal to or greater than desired kW. (Limits temperature rise across the coil to 45°F.)

$$kW \leq cfm \times 0.0142$$

These requirements established to prevent excessive temperature rise caused by low airflow and/or oversized coils. Minimum airflow limits must be within recommended ranges to ensure proper operation and long service life. For optimum diffuser performance and maximum thermal comfort, coil discharge temperatures should not be more than 15°F above desired room temperatures. For proper coil operation it is recommended that coil discharge temperatures do not to exceed 100°F.

PESV, AESV, DESV / APPLICATION DATA (LYNERGY HEAT)

Inlet Size	Heating cfm Range	208V 1 Phase kW Range		240V 1 Phase kW Range		277V 1 Phase kW Range		208V 3 Phase kW Range		480V 3 Phase kW Range	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
4	55-225	0.5	3.0	1.0	3.0	1.0	3.0	1.5	3.0	2.5	3.0
5	85-350	0.5	5.0	1.0	5.0	1.0	5.0	1.5	5.0	2.5	5.0
6	105-500	0.5	7.5	1.0	7.5	1.0	7.5	1.5	7.5	2.5	7.5
7	135-650	0.5	9.5	1.0	9.5	1.0	9.5	1.5	9.5	2.5	9.5
8	190-900	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	13.0
9	225-1050	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	16.0
10	300-1400	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	21.0
12	425-2000	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	25.0
14	575-3000	1.0	9.5	1.0	11.0	1.5	13.0	1.5	10.5	3.0	25.0
16	750-4000	1.0	9.5	1.0	11.0	1.5	13.0	1.5	10.5	3.0	25.0
24x16	1800-8000	1.0	9.5	1.0	11.0	1.5	13.0	1.5	10.5	4.0	25.0

Note: The Titus 480V, 3-phase electric heat configuration is 4-wire wye. Contact your Titus representative for other configuration options.

Useful formulas:

$$kW = \frac{cfm \times \Delta T}{3160} \quad \text{or} \quad \Delta T = \frac{kW \times 3160}{cfm} \quad \text{or} \quad cfm = \frac{kW \times 3160}{\Delta T}$$

Where ΔT = air temperature rise.

APPENDIX D

HAZARDOUS MATERIALS

HOMOGENEOUS AREAS

REPORT DATE: 9/6/2010

ASBESTOS CONTENT: C - Chrysotile, A - Amosite, CR - Crocidolite, TR - Tremolite, AC - Actinolite, AN - Anthophylite, ASMD - Assumed, NAD - None Detected

Building Number: 022 **Client Number:** 100152

Building Name: Building 22 - Education Building **Client Name:** Lebanon VA Medical Center

HOMO AREA	MATERIAL	LOCATION	APPROX AMOUNT	CLASSIFICATION	FRIABILITY	ASBESTOS CONTENT	SAMPLE NUMBERS	INSPECTION DATE
01	Pipe Insulation	1st Floor Kitchen Storage Room	25 Lineal Feet	THERMAL SYSTEM INSULATION	FRIABLE	Assumed	-	8/19/2010
02	Pipe Fitting Insulation	1st Floor Kitchen Storage Room	8 Fittings	THERMAL SYSTEM INSULATION	FRIABLE	Assumed	-	8/19/2010
03	Transite Wall Panels	3rd Floor Mechanical Chase	50 Square Feet	MISCELLANEOUS MATERIAL	NON-FRIABLE	Assumed	-	8/19/2010
04	9x9 Floor Tile	1st Floor Storage Room	220 Square Feet	MISCELLANEOUS MATERIAL	NON-FRIABLE	Assumed	-	8/19/2010
05	9x9 Floor Tile Mastic	1st Floor Storage Room	220 Square Feet	MISCELLANEOUS MATERIAL	NON-FRIABLE	Assumed	-	8/19/2010

HOMOGENEOUS AREAS

REPORT DATE: 9/5/2010

ASBESTOS CONTENT: C - Chrysotile, A - Amosite, CR - Crocidolite, TR - Tremolite, AC - Actinolite, AN - Anthophylite, ASMD - Assumed, NAD - None Detected

Building Number: 019 **Client Number:** 100152

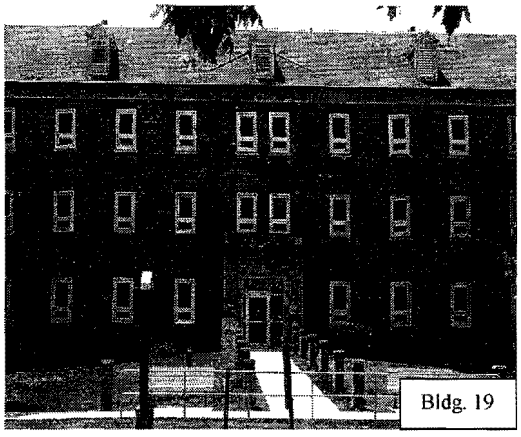
Building Name: Buidling 19- Office Building **Client Name:** Lebanon VA Medical Center

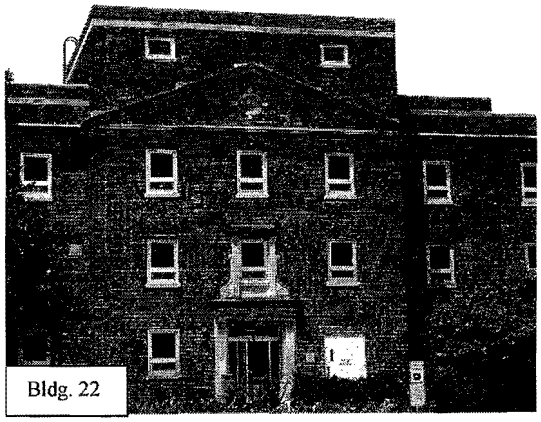
HOMO AREA	MATERIAL	LOCATION	APPROX AMOUNT	CLASSIFICATION	FRIABILITY	ASBESTOS CONTENT	SAMPLE NUMBERS	INSPECTION DATE
01	Pipe Insulation	1st Floor Storage Closet & 3rd Floor Pipe Chase Area	25 Lineal Feet	THERMAL SYSTEM INSULATION	FRIABLE	Assumed	-	8/19/2010
02	Pipe Fitting Insulation	1st Floor Storage Closet & 3rd Floor Pipe Chase Areas	5 Fittings	THERMAL SYSTEM INSULATION	FRIABLE	Assumed	-	8/19/2010
03	9"x9" Floor Tile (Miscellaneous Colors)	Miscellaneous Areas Throughout Building	9900 Square Feet	MISCELLANEOUS MATERIAL	NON-FRIABLE	Assumed	-	8/19/2010
04	Floor Tile Mastic (Under 9x9 Floor Tile)	1st Floor Offices 136A & 137A	10200 Square Feet	MISCELLANEOUS MATERIAL	NON-FRIABLE	Assumed	-	8/19/2010

ASBESTOS HAZARD ASSESSMENT REPORT

IMPROVE EMERGENCY CACHE

VAMC LEBANON, PA





CONTRACT NO. VA24412R0058
PROJECT NO. 595-11-127

Prepared for:

Department of Veterans Affairs Medical Center
Lebanon, PA

Prepared By:

Environmental Solutions Group, Inc.
4142 Ogletown-Stanton Road, Suite 226
Newark, DE 19713

ENVIRONMENTAL SOLUTIONS GROUP, INC.
A Service Disabled Veteran-Owned Business

August 2012

1.0 INTRODUCTION

Environmental Solutions Group, Inc. (ESG) was contracted by Miller-Remick, LLC to provide asbestos investigation and abatement oversight services in connection with Contract No. VA244-12-R-0058, Project No. 595-11-127, Improve Emergency Cache. This project involves renovations in portions of two buildings. The two buildings are building 19, having approximately 6,600 square feet of space and building 22, having approximately 14,000 square feet of space.

Specific SOW items that deal with these services are:

- Review VA-provided sampling data and interview station personnel regarding asbestos containing materials
- Perform a visual site inspection and collect potential bulk samples as per USEPA guidance
- Have potential samples analyzed using USEPA-approved analysis
- Prepare an Assessment Report that identifies the types and location of ACM found
- Provide quantity and cost estimates for all asbestos to be abated
- Provide CAD drawings showing critical sample locations and containment to be constructed during abatement
- Prepare Asbestos Abatement Specifications using the VA Master Specifications
- Assist the VA in selection of an ACM abatement Company
- Provide construction period services

2.0 SCOPE OF WORK

As part of contractual requirements described in Section One, this report describes:

1. The methodology used for the collection of potential ACM samples within the spaces in the project area
2. The results of ACM laboratory analyses of the collected samples
3. A description of the impacted areas within the project area
4. A summary of the amount of ACM in each impacted space
5. An estimate of the cost for ACM abatement

2.1 ACM Bulk Sampling

Potential ACM samples were collected in accordance with USEPA guidelines and by a Pennsylvania-AHERA certified technician. Once homogeneous materials are identified, the USEPA recommends the following sampling from these materials:

- three (3) samples from less than 1,000 square feet
- five (5) samples from 1,000 to 5,000 square feet
- seven (7) samples from greater than 5,000 square feet
- three (3) samples from homogeneous thermal materials
- at least one sample from miscellaneous materials

If it is determined that additional potential ACM samples must be collected, they will be collected in accordance with 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants; (HESHAPS) Asbestos.

2.2 Segregation of the Project Area

There were minimal historical ACM sampling data available, therefore the entire project area was sampled for potential ACM using USEPA guidelines. However, ESG representatives did not perform destructive sampling.

In building 19, eight (8) different Homogeneous Areas (suspect ACM) were identified and in building 22, fourteen (14) were identified. A total of forty seven (47) bulk samples were collected from various building materials in the two buildings. Figures (not to scale) showing the sampling locations are included in Attachment A, and the Homogeneous Identification Reports are shown in Attachment B.

3.0 ASBESTOS CONTAINING MATERIAL SAMPLING ANALYSIS

A total of forty seven (47) potential ACM samples were collected during the July 2012, site visit and sampling event. The sample Chain of Custody and Laboratory Analytical Data is included in Attachment C. These samples were transported to a NVLAP qualified laboratory for analysis. USEPA Analysis Method EPA: 600/M4-82-020 was used to analyze the samples. By definition, any material containing more than 1% by volume of asbestos fibers is classified as ACM and has been included for abatement. The Certificate of Analysis for the samples is included in Attachment D.

Asbestos insulated pipes may exist within wall cavities specifically in bathroom, kitchen and heater pipe riser areas. Wall block demolition will be needed to access these areas.

3.1 Homogeneous Identification Reports

The Homogeneous Identification Report (HIR) shows the homogeneous identification, corresponding room number, the type of potential ACM sampled, the percent of asbestos in the sample (if any) and the amount of each material in square feet (sf) or linear feet (lf).

3.2 Chain of Custody and Laboratory Data

The Chain of Custody includes the sample number for each sample, the homogeneous area of the sample, and whether the sample was analyzed as positive (>1%) asbestos fibers.

4.0 QUANTITIES TO BE ABATED

A total of forty seven (47) samples were collected as part of this investigation and the quantities of materials which have greater than 1% asbestos are shown in the table below.

	Building No. 19	
Homogeneous Area	**Description**	**Length/Volume**
C2-1	Floor Tile, 9X9", black w/off white & green swirls	64 sf

Notes:

sf= square feet

6.0 PRELIMINARY ABATEMENT SCHEDULE

6.1 Pre-Abatement Activities

Asbestos Containing Material abatement cannot proceed until each area is prepared for abatement activities. This means that all stored or other materials are removed from each abatement area and wherever necessary and temporary lighting is installed.

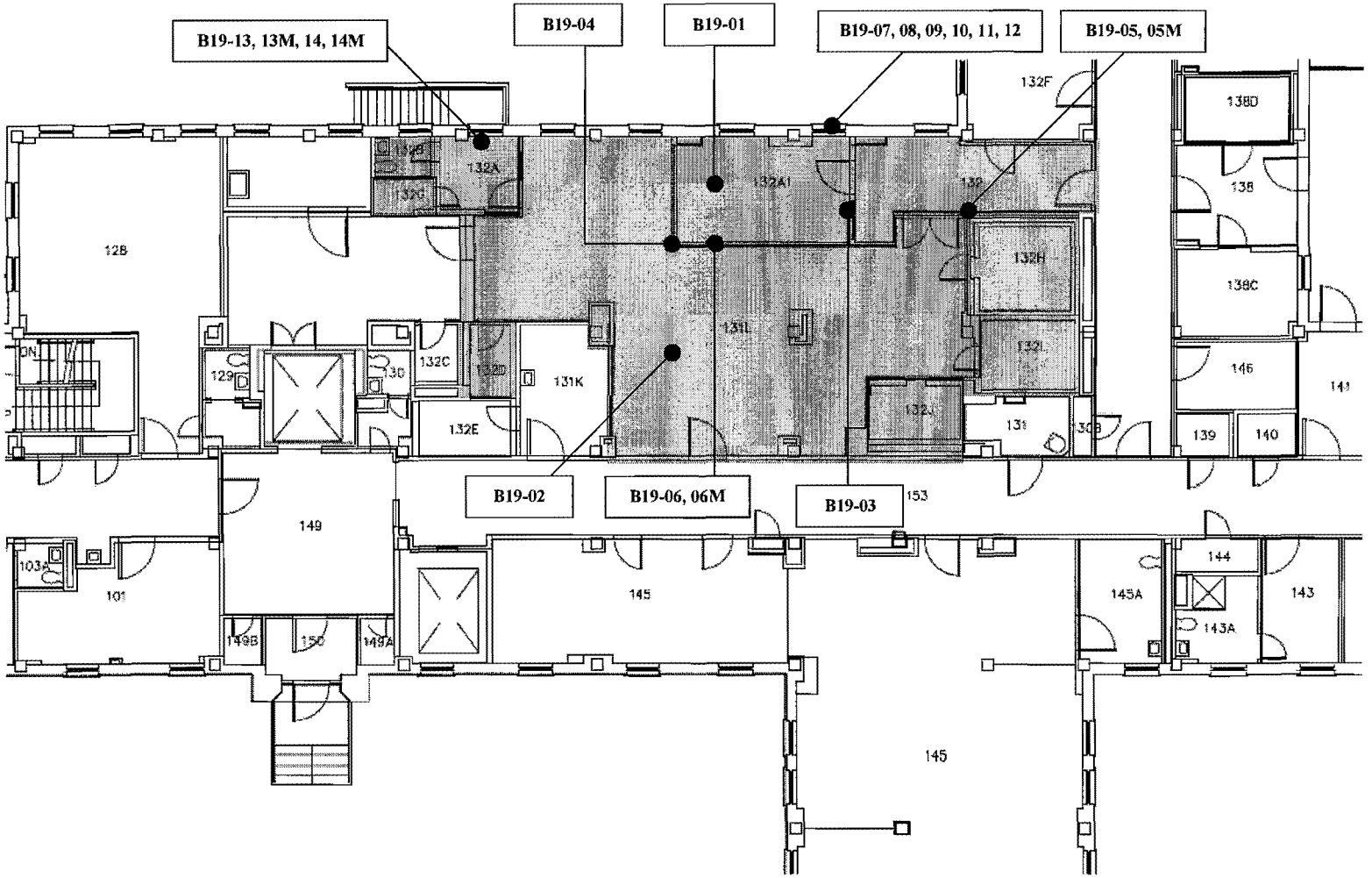
6.2 Building Sub-Systems Impact

Since the only building system to be abated is the floor tile in Room 132A of Building 19, the abatement is not anticipated to impact any other building systems.

ATTACHMENT A

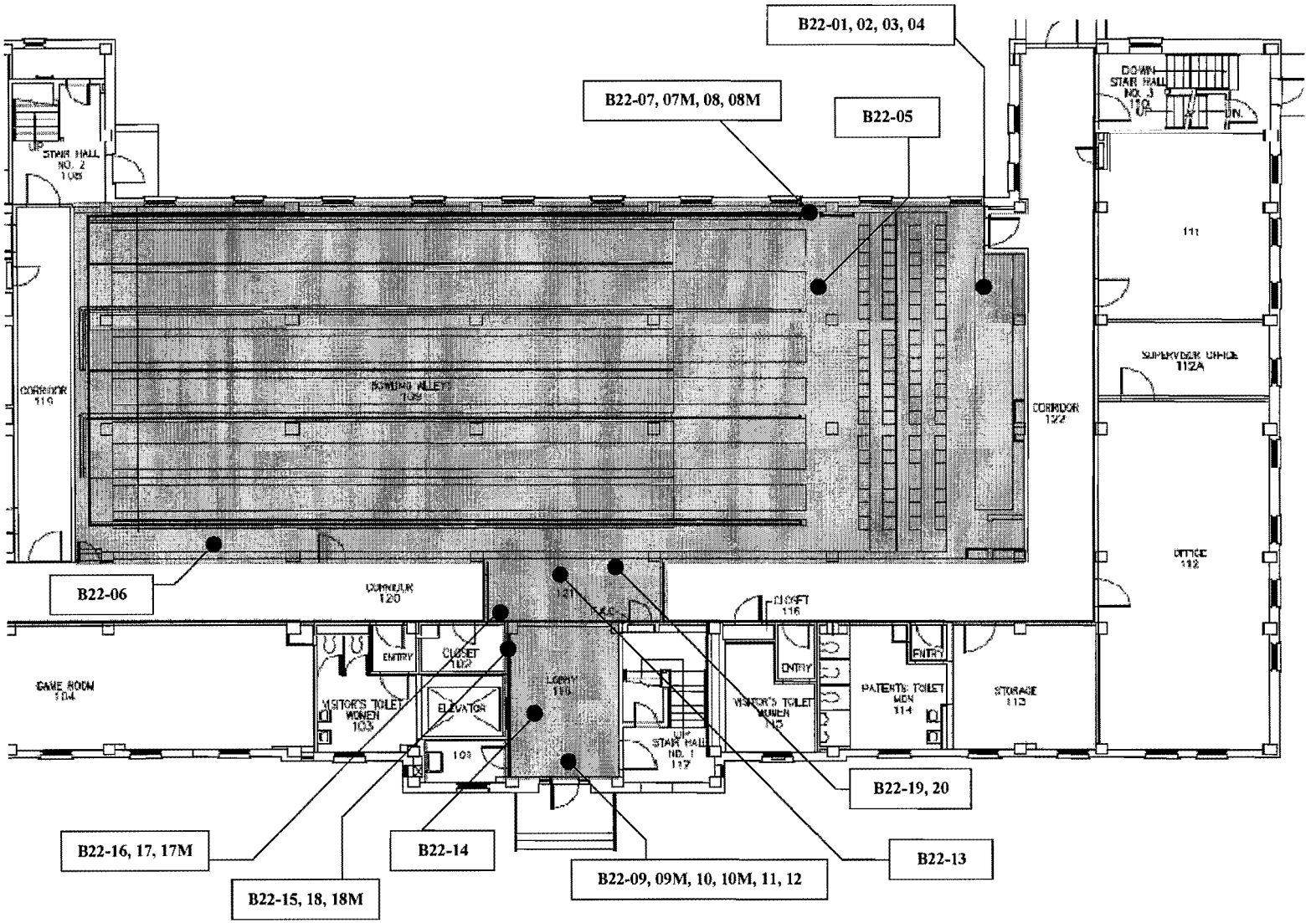
FIGURES WITH SAMPLE LOCATIONS

FIRST FLOOR PLAN / SAMPLE LOCATION MAP



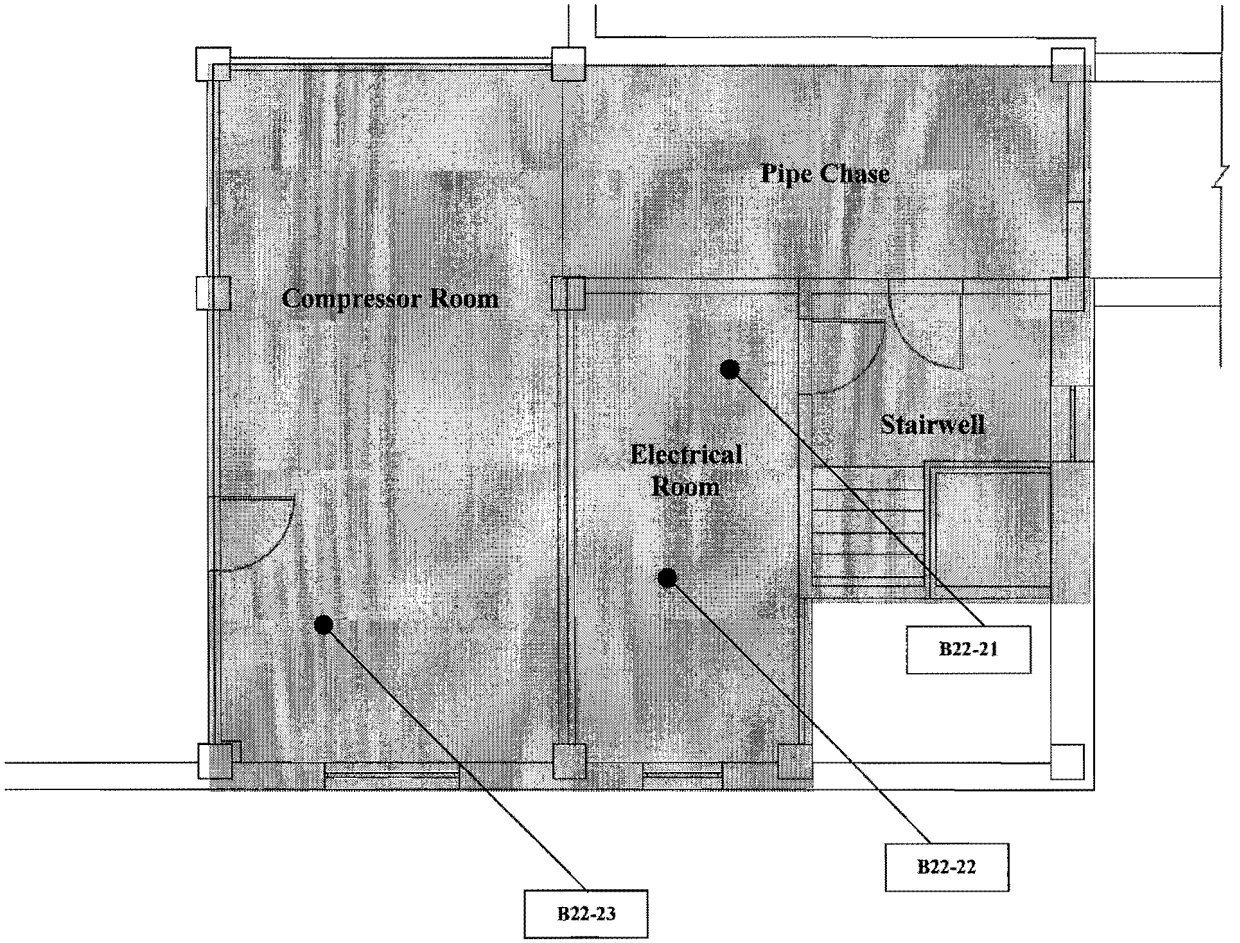
Drawing Not to Scale - For Reference Only

FIRST FLOOR PLAN / SAMPLE LOCATION MAP



Drawing Not to Scale - For Reference Only

BASEMENT FLOOR PLAN / SAMPLE LOCATION MAP



Drawing Not to Scale - For Reference Only

ATTACHMENT B

HOMOGENEOUS AREA IDENTIFICATION

HOMOGENEOUS AREA IDENTIFICATION

HOMO AREA ID.	SAMPLE NO.	DESCRIPTION	F	NF	QUANTITY	SAMPLES	POS
C1-1	B19-01, 02	2' X 4' White random ceiling tile		X		2	
C3-1	B19-03, 04	Drywall	X			2	
C3-2	B19-05, 06	6" Brown cove base molding		X		2	
C3-2M	B19-05M, 06M	C3-2 Mastic		X		2	
A5-1S	B19-07, 08, 09	Skim coat plaster	X			3	
A5-1R	B19-10, 11, 12	Rough coat plaster		X		3	
C2-1	B19-13, 14	9" X 9" Black with off white and green swirls floor tile		X	64 SF	2	X
C2-1M	B19-13M, 14M	C2-1 Mastic		X		2	

LEGEND: F—FRIABLE NF—NON-FRIABLE POS—TESTED/ASSUMED POSITIVE
grv — GRAVIMETRIC SAMPLE

HOMOGENEOUS AREA IDENTIFICATION

HOMO AREA ID.	SAMPLE NO.	DESCRIPTION	F	NF	QUANTITY	SAMPLES	POS
C2-1	B22-01, 02	12" X 12" Dark gray mottled floor tile		X		2	
C2-1M	B22-03, 04	C2-1 Mastic		X		2	
C1-1	B22-05, 06	2' X 2' White textured with pinholes ceiling tile	X			2	
C3-1	B22-07, 08	4" Beige cove base molding		X		2	
C3-1M	B22-07M, 08M	C3-1 Mastic		X		2	
C2-2	B22-09, 10	12" X 12" Beige mottled floor tile		X		2	
C2-M	B22-09M, 10M	C2-2 and C2-3 Mastic		X		2	
C2-3	B22-11, 12	12" X 12" Green mottled floor tile		X		2	
C1-2	B22-13, 14	2' X 4' E-W pattern ceiling tile	X			2	
C3-2	B22-15, 16	Beige and white leaf pattern wallpaper		X		2	
C3-3	B22-17, 18	6" Light brown cove base molding		X		2	
C3-3M	B22-17M, 18M	C3-3 Mastic		X		2	
C3-4	B22-19, 20	Drywall	X			2	
A1-1	B22-21, 22, 23	Sprayed on insulation	X			3	

LEGEND: F—FRIABLE NF—NON-FRIABLE POS—TESTED/ASSUMED POSITIVE
grv — GRAVIMETRIC SAMPLE

ATTACHMENT C

CHAIN OF CUSTODY

AND

ANALYTICAL DATA

EAA
ENVIRONMENTAL ABATEMENT ASSOCIATES, INC.

LEBANON VA MEDICAL CENTER
BUILDING 19 – IMPROVE EMERGENCY CACHE

CHAIN OF CUSTODY

JOB NUMBER 12-036-1
LABORATORY: NAME EMSL Analytical, Inc. LAB # 101048-0
ANALYSIS: ■ PLM ☐ SEM

SAMPLES COLLECTED BY *(Signature)* Christa Kroon *#035177*
SAMPLES DISPATCHED TO LAB BY EAA DATE 07/19/12 TIME 1720
SAMPLES RECEIVED BY EMSL Analytical, Inc. DATE 07/20/12 TIME 0940
SAMPLES ANALYSIS BY C. Walker / N. Stalter DATE 07/20/12 TIME 1915
ANALYSIS RESULTS TO EAA DATE 07/20/12 TIME 0810
SAMPLES STORED BY EMSL Analytical, Inc. DATE 07/20/12 TIME 0830

BULK SAMPLE LOG

SAMPLE #	HOMOGENEOUS AREA I. D.	FUNCTIONAL SPACE	SAMPLE LOCATION	FRIABLE		ASBESTOS	
				Yes	No	Yes	No
B19-01	C1-1	132A1	Ceiling	X			X
B19-02	C1-1	131L	Ceiling	X			X
B19-03	C3-1	132A1	Wall	X			X
B19-04	C3-1	131L	Wall	X			X
B19-05	C3-2	132	Cove base		X		X
B19-05M	C3-2M	132	Cove base		X		X
B19-06	C3-2	131L	Cove base		X		X
B19-06M	C3-2M	131L	Cove base		X		X
B19-07	A5-1S	132A1	Above window	X			X
B19-08	A5-1S	132A1	Above window	X			X
B19-09	A5-1S	132A1	Above window	X			X
B19-10	A5-1R	132A1	Above window		X		X
B19-11	A5-1R	132A1	Above window		X		X
B19-12	A5-1R	132A1	Above window		X		X
B19-13	C2-1	132A	Floor		X	X	
B19-13M	C2-1M	132A	Floor		X		X
B19-14	C2-1	132A	Floor		X	X	
B19-14M	C2-1M	132A	Floor		X		X

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-5974
http://www.emsl.com cinnasblab@EMSL.com

EMSL Order:	041219103
CustomerID:	ENVA55
CustomerPO:	CK #10915
ProjectID:	

Attn: **Christa Knorr**
Environmental Abatement Associates, Inc.
143 West Main Street

Plymouth, PA 18651

Phone:	(570) 779-4242
Fax:	(570) 779-0929
Received:	07/20/12 9:40 AM
Analysis Date:	7/20/2012
Collected:	7/18/2012

Project: **12-036-1/ Lebanon VA Medical Center-Bldg 19 Improve Emergency Cache**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**		**% Non-Fibrous**	**% Type**
B19-01 *041219103-0001*	132A1 - ceiling tile	Gray/White Fibrous Heterogeneous	45% Cellulose 35% Min. Wool		20% Non-fibrous (other)	**None Detected**
B19-02 *041219103-0002*	131L - ceiling tile	Gray/White Fibrous Heterogeneous	45% Cellulose 35% Min. Wool		20% Non-fibrous (other)	**None Detected**
B19-03 *041219103-0003*	132A1 - drywall	Brown/White Fibrous Heterogeneous	15% Cellulose		85% Non-fibrous (other)	**None Detected**
B19-04 *041219103-0004*	131L - drywall	Brown/White Fibrous Heterogeneous	15% Cellulose		85% Non-fibrous (other)	**None Detected**
B19-05-Cove Base *041219103-0005*	132 - covebase	Brown Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B19-05-Mastic *041219103-0005A*	132 - covebase	Beige Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B19-06-Cove Base *041219103-0006*	131L - covebase	Brown Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**
B19-06-Mastic *041219103-0006A*	131L - covebase	Beige Non-Fibrous Heterogeneous			100% Non-fibrous (other)	**None Detected**

Analyst(s)
Christina Walker (10)
Nancy Stalter (8)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

Initial report from 07/20/2012 23:43:42

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B19-07 *041219103-0007*	132A1 - skim coat plaster	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B19-08 *041219103-0008*	132A1 - skim coat plaster	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B19-09 *041219103-0009*	132A1 - skim coat plaster	White Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B19-10 *041219103-0010*	132A1 - rough coat plaster	Tan Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B19-11 *041219103-0011*	132A1 - rough coat plaster	Tan Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B19-12 *041219103-0012*	132A1 - rough coat plaster	Tan Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B19-13-Floor Tile *041219103-0013*	132A - floor tile	Black Non-Fibrous Heterogeneous		95% Non-fibrous (other)	**5% Chrysotile**
B19-13-Mastic *041219103-0013A*	132A - floor tile	Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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Project: **12-036-1/ Lebanon VA Medical Center-Bldg 19 Improve Emergency Cache**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B19-14-Floor Tile *041219103-0014*	132A - floor tile	Black Fibrous Heterogeneous		95% Non-fibrous (other)	**5% Chrysotile**
B19-14-Mastic *041219103-0014A*	132A - floor tile	Black Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
Christina Walker (10)
Nancy Stalter (8)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

Initial report from 07/20/2012 23:43:42

EAA
ENVIRONMENTAL ABATEMENT ASSOCIATES, INC.

LEBANON VA MEDICAL CENTER
BUILDING 22 – IMPROVE EMERGENCY CACHE

CHAIN OF CUSTODY

JOB NUMBER 12-036-1
LABORATORY: NAME EMSL Analytical, Inc. LAB # 101048-0
ANALYSIS: ■ PLM ☐ SEM

SAMPLES COLLECTED BY *(Signature)* Christa Koron *#035177*
SAMPLES DISPATCHED TO LAB BY EAA DATE 07/19/12 TIME 1720
SAMPLES RECEIVED BY EMSL Analytical, Inc. DATE 07/20/12 TIME 0940
SAMPLES ANALYSIS BY C. Walker / N. Stalter DATE 07/20/12 TIME 1600
ANALYSIS RESULTS TO EAA DATE 07/21/12 TIME 0805
SAMPLES STORED BY EMSL Analytical, Inc. DATE 07/21/12 TIME 0830

BULK SAMPLE LOG

SAMPLE #	HOMOGENEOUS AREA I. D.	FUNCTIONAL SPACE	SAMPLE LOCATION	FRIABLE		ASBESTOS	
				Yes	No	Yes	No
B22-01	C2-1	109 – Maintenance Storage	Floor		X		X
B22-02	C2-1	109 – Maintenance Storage	Floor		X		X
B22-03	C2-1M	109 – Maintenance Storage	Floor		X		X
B22-04	C2-1M	109 – Maintenance Storage	Floor		X		X
B22-05	C1-1	109 – Bowling Alleys	Ceiling	X			X
B22-06	C1-1	109 – Bowling Alleys	Ceiling	X			X
B22-07	C3-1	109 – Bowling Alleys	Cove base		X		X
B22-07M	C3-1M	109 – Bowling Alleys	Cove base		X		X
B22-08	C3-1	109 – Bowling Alleys	Cove base		X		X
B22-08M	C3-1M	109 – Bowling Alleys	Cove base		X		X
B22-09	C2-2	Lobby 118	Floor		X		X
B22-09M	C2-M	Lobby 118	Floor		X		X
B22-10	C2-2	Lobby 118	Floor		X		X
B22-10M	C2-M	Lobby 118	Floor		X		X
B22-11	C2-3	Lobby 118	Floor		X		X
B22-12	C2-3	Lobby 118	Floor		X		X
B22-13	C1-2	Corridor 121	Ceiling	X			X
B22-14	C1-2	Lobby 118	Ceiling	X			X
B22-15	C3-2	Lobby 118	Wall		X		X
B22-16	C3-2	Corridor 121	Wall		X		X

SAMPLE #	HOMOGENEOUS AREA I. D.	FUNCTIONAL SPACE	SAMPLE LOCATION	FRIABLE		ASBESTOS	
				Yes	No	Yes	No
B22-17	C3-3	Corridor 121	Cove base		X		X
B22-17M	C3-3M	Corridor 121	Cove base		X		X
B22-18	C3-3	Lobby 118	Cove base		X		X
B22-18M	C3-3M	Lobby 118	Cove base		X		X
B22-19	C3-4	Corridor 121	Wall	X			X
B22-20	C3-4	Corridor 121	Wall	X			X
B22-21	A1-1	Electrical Room	Ceiling beam	X			X
B22-22	A1-1	Electrical Room	Ceiling beam	X			X
B22-23	A1-1	Compressor Room	Ceiling beam	X			X

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Phone/Fax: (800) 220-3675 / (856) 786-5974
http://www.emsl.com cinnasblab@EMSL.com

EMSL Order:	041219104
CustomerID:	ENVA55
CustomerPO:	CK #10915
ProjectID:	

Attn: **Christa Knorr**
Environmental Abatement Associates, Inc.
143 West Main Street

Plymouth, PA 18651

Phone:	(570) 779-4242
Fax:	(570) 779-0929
Received:	07/20/12 9:40 AM
Analysis Date:	7/20/2012
Collected:	7/18/2012

Project: **12-036-1/ Lebanon VA Medical Center-Bldg 22 Improve Emergency Cache**

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 and/or EPA 600/M4-82-020 Method(s) using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B22-01 *041219104-0001*	109 maintenance storage - floor tile	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
			Recommend TEM		
B22-02 *041219104-0002*	109 maintenance storage - floor tile	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
			Recommend TEM		
B22-03 *041219104-0003*	109 maintenance storage - floor tile mastic	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-04 *041219104-0004*	109 maintenance storage - floor tile mastic	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-05 *041219104-0005*	109 bowling alleys - ceiling tile	Gray/White Fibrous Heterogeneous	45% Cellulose 35% Min. Wool	20% Non-fibrous (other)	**None Detected**
B22-06 *041219104-0006*	109 bowling alleys - ceiling tile	Gray/White Non-Fibrous Heterogeneous	45% Cellulose 35% Min. Wool	20% Non-fibrous (other)	**None Detected**
B22-07-Cove Base *041219104-0007*	109 bowling alleys - covebase	Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-07-Mastic *041219104-0007A*	109 bowling alleys - covebase	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)

Christina Walker (15)
Nancy Stalter (14)

Stephen Siegel, CIH, Laboratory Manager
or other approved signatory

Initial report from 07/20/2012 23:41:25

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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B22-08-Cove Base *041219104-0008*	109 bowling alleys - covebase	Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-08-Mastic *041219104-0008A*	109 bowling alleys - covebase	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-09-Floor Tile *041219104-0009*	Lobby 118 - beige floor tile	Beige Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-09-Mastic *041219104-0009A*	Lobby 118 - beige floor tile	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-10-Floor Tile *041219104-0010*	Lobby 118 - beige floor tile	Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-10-Mastic *041219104-0010A*	Lobby 118 - beige floor tile	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-11 *041219104-0011*	Lobby 118 - green floor tile	Green Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-12 *041219104-0012*	Lobby 118 - green floor tile	Green Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
B22-13 *041219104-0013*	Corridor 121 - ceiling tile	Gray/White Fibrous Heterogeneous	45% Cellulose 35% Min. Wool	20% Non-fibrous (other)	**None Detected**
B22-14 *041219104-0014*	Lobby 118 - ceiling tile	Gray Fibrous Heterogeneous	45% Cellulose 35% Min. Wool	20% Non-fibrous (other)	**None Detected**
B22-15 *041219104-0015*	Lobby 118 - wallpaper	White Fibrous Heterogeneous	85% Cellulose	15% Non-fibrous (other)	**None Detected**
B22-16 *041219104-0016*	Corridor 121 - wallpaper	White Fibrous Heterogeneous	85% Cellulose	15% Non-fibrous (other)	**None Detected**
B22-17-Cove Base *041219104-0017*	Corridor 121 - covebase	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-17-Mastic *041219104-0017A*	Corridor 121 - covebase	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-18-Cove Base *041219104-0018*	Lobby 118 - covebase	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**
B22-18-Mastic *041219104-0018A*	Lobby 118 - covebase	Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (other)	**None Detected**

Analyst(s)
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			Non-Asbestos			Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**		**% Non-Fibrous**	**% Type**
B22-19 *041219104-0019*	Corridor 121 - drywall	Tan/White Fibrous Heterogeneous	15% Cellulose 2% Glass		83% Non-fibrous (other)	**None Detected**
B22-20 *041219104-0020*	Corridor 121 - drywall	Tan/White Fibrous Heterogeneous	15% Cellulose 2% Glass		83% Non-fibrous (other)	**None Detected**
B22-21 *041219104-0021*	Electrical room - sprayed on	Brown Fibrous Heterogeneous	20% Cellulose		80% Non-fibrous (other)	**None Detected**
B22-22 *041219104-0022*	Electrical room - sprayed on	Brown Fibrous Heterogeneous	25% Cellulose		75% Non-fibrous (other)	**None Detected**
B22-23 *041219104-0023*	Compressor room - sprayed on	Brown Fibrous Heterogeneous	25% Cellulose		75% Non-fibrous (other)	**None Detected**

Analyst(s)

Christina Walker (15)
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Initial report from 07/20/2012 23:41:25

ATTACHMENT D

CERTIFICATE OF ANALYSIS

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101048-0

EMSL Analytical, Inc.

Cinnaminson, NJ

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

BULK ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2012-07-01 through 2013-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
Mr. Stephen Siegel, CIH
Phone: 800-220-3675 Fax: 856-786-5973
E-Mail: ssiegel@emsl.com
URL: http://www.emsl.com

BULK ASBESTOS FIBER ANALYSIS (PLM) **NVLAP LAB CODE 101048-0**

NVLAP Code	*Designation / Description*
18/A01	EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples

2012-07-01 through 2013-06-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

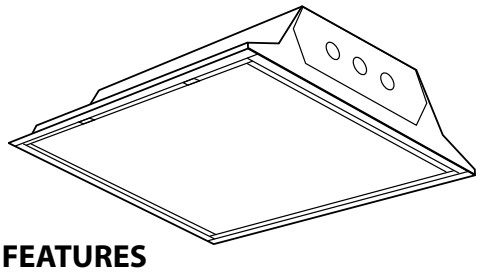
APPENDIX E

ELECTRICAL

Columbia LIGHTING

WT22

2' × 2' Wet Location Lensed Troffer / 2, 3, or 4-Lamp T5, T5HO, T8, TT, U-Bent



PROJECT INFORMATION

Project Name

Catalog No.

A1

Type

Date

FEATURES

- Wet label housing troffer
- Gasketed to provide additional seal between door, lens, and housing
- Mitered corners standard on door frame
- Mechanical light trap
- All metal parts are white powder coat, painted after fabrication
- UL listed 1598 for wet location covered ceiling applications
- Rotary action cam latches. Smooth operating for secure shielding retention
- Corner hinging for easy insertion and removal of shielding frame
- Housing ends are secured by unique corner interlock and screws
- Metal to metal light leak protection on all four sides of shielding frame
- Rotary lock lampholders for positive lamp contact
- Heat sink embossments behind ballasts for cooler operation and longer life

FLANGED FEATURES
Four adjustable Uni-Lugs for quick easy installation. Optional plaster frames available for individual or row mounting.

HOUSING
Heavy gauge steel. Die formed for extra rigidity. Designed for installation in standard inverted tee grid ceilings.

BALLASTS
Thermally protected, automatic resetting, Class P, high power factor, sound rated A, unless otherwise specified. CEE NEMA Premium compliant.

ELECTRICAL
Standard class "P," thermally protected, autoresetting HPF ballast, sound rated A. CEE NEMA Premium compliant. All ballast leads extend a minimum of 6" through access location. NEC/CEC-compliant ballast disconnect is standard.

FINISH
All metal parts are processed with a five phase phosphate bonding treatment. Grid units are pre-painted with high glass baked white enamel, 86% reflective. Flanged units are painted after fabrication with a polyester powder coat, reflectance of 90%.

SHIELDING
100% prismatic acrylic, extruded and roll-embossed, diagonally oriented female prisms, unless otherwise specified.

FLANGED UNIT INSTALLATION
Fixtures are installed from below the ceiling and have overlapping trim flanges. Adjustable Uni-Lugs secure the fixture to the ceiling structure. Plaster frames are available if required.

CERTIFICATION
All luminaires are built to UL 1598 standards and bear appropriate UL and cUL or CSA labels. Wet location labeling is standard.

ORDERING INFORMATION

EXAMPLE WT22-417G-FAA12-EU

WT 22 – – – –

MODEL
- **WT** Wet Location Lensed Troffer

NO. OF LAMPS
- **2** Two
- **3** Three
- **4** Four

CEILING TYPE
- **G** Inverted T-bar
- **F** Overlap Flange

SIZE
- **22** 2' × 2'

LAMP TYPE
- **14** 2', T5: 14 Watt
- **17** 2', T8: 17 Watt
- **24** 2', T5HO: 24 Watt
- **40TT** Twin Tube Compact, 2G11 Base: 40 Watt
- **31U1** U-Bent, 1⅝" Leg Spacing T8: 31 Watt
- **32U6** U-Bent, 6" Leg Spacing T8: 32 Watt

DOOR STYLE
- **FA** White Flush Aluminum
- **RA** White Regressed Aluminum

SHIELDING
- **A12** Pattern 12 Acrylic 0.100" Nominal (Standard)
- **A12.125** Pattern 12 Acrylic 0.125" Nominal
- **A19** Pattern 19 Acrylic 0.156" Male Prism
- **DR12** High Impact Acrylic Pattern 12, .140" (Std.)

For complete list of lenses and louvers, see options and accessories.

VOLTAGE
- **U** 120V-277V
- **347** 347V

BALLAST
- **E** Electronic T8, Instant Start
- **3E** 3-lamp Electronic Instant Start (T8)
- **4E** 4-Lamp Electronic T8, Instant Start
- **EP** Electronic T5 or T8, Programmed Start
- **3EP** 3-lamp Electronic Programmed Start (T8, T5HO) Others available.
- **4EP** 4-Lamp Electronic T5HO (N/A 347V) or T8, Programmed Start
- **EPTT** Electronic Programmed Start (40TT)

For a specific ballast vendor, show as option.

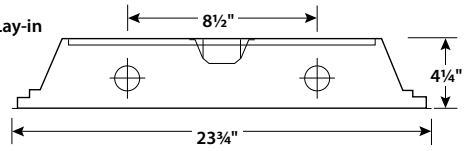
OPTIONS
- **F0730** T8, 70CRI, 3000K Lamps, Furn/Inst.
- **F0735** T8, 70CRI, 3500K Lamps, Furn/Inst.
- **F0741** T8, 70CRI, 4100K Lamps, Furn/Inst.
- **SLL** Spring Loaded Latches
- **GMF** Slow Blow Fuse
- **GLR** Fast Blow Fuse
- **C388** ⅜" Flex with 3 No. 18 Wires
- **C384** ⅜" Flex with 3 No. 14 Wires
- **C488** ⅜" Flex with 4 No. 18 Wires
- **C424** ½" Flex with 4 No. 14 Wires
- **NYC** NYC Compliant
- **NYCU** NYC Compliant, Union Label

For a complete set of options, see options and accessories section.

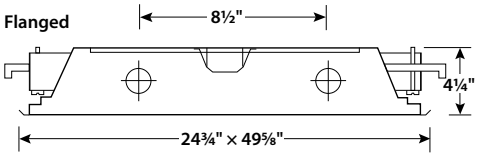
PHOTOMETRIC DATA – CONTACT FACTORY

DIMENSIONAL DATA

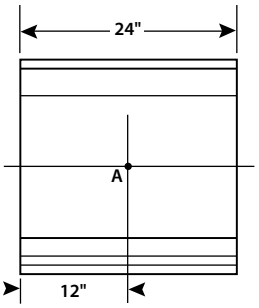
2' × 2' 2-Lamp Lay-in



2' × 2' 2-Lamp Flanged

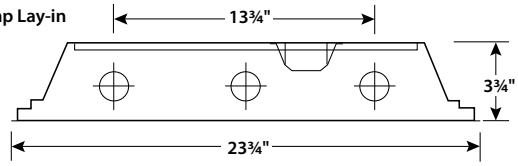


Flanged cut out dimensions for single unit only: 24" × 24⅞"

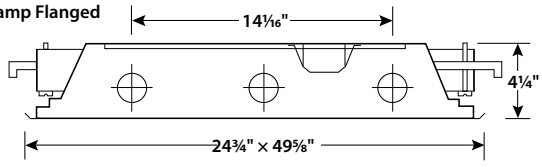


A: ⅞" Diameter Knockout

2' × 2' 3-Lamp Lay-in

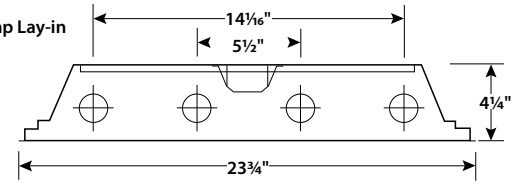


2' × 2' 3-Lamp Flanged

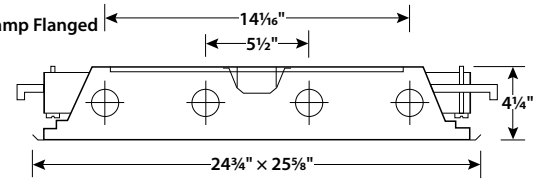


Flanged cut out dimensions for single unit only: 24" × 24⅞"

2' × 2' 4-Lamp Lay-in



2' × 2' 4-Lamp Flanged



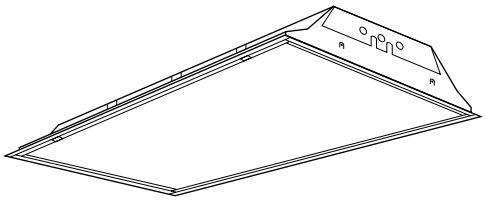
Flanged cut out dimensions for single unit only: 24" × 24⅞"

NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

Columbia LIGHTING

WT24

2' × 4' Wet Location Lensed Troffer / 2, 3, 4, or 6-Lamp T5, T5HO, T8



PROJECT INFORMATION

Project Name

Catalog No.

A2

Type

Date

FEATURES

- Wet label shallow housing troffer
- Gasketed to provide additional seal between door, lens, and housing
- Mitered corners standard on door frame
- Rolled or hemmed housing edges
- Mechanical light trap
- All metal parts are white powder coat, painted after fabrication
- UL listed 1598 for wet location covered ceiling applications
- Integral T-bar clips quickly secure fixture to the grid system without the need for time-consuming loose parts
- Snap-in ballast covers can be removed when lamps are installed
- Corner hinging for easy insertion and removal of shielding frame
- Flush steel shielding frame, screw assembled for easy diffuser replacement
- Housing ends are secured by unique corner interlock and screws
- Heat sink embossments behind ballasts for cooler operation and longer life
- Metal to metal light leak protection on all four sides of shielding frame

FLANGED FEATURES
Four adjustable Uni-Lugs for quick easy installation. Optional plaster frames available for individual or row mounting. Fixture end flanges are removable for row mounting. Joiner channels are included.

HOUSING
Heavy gauge steel. Die formed for extra rigidity. Designed for installation in standard inverted tee grid ceilings.

BALLASTS
Energy efficient, thermally protected, automatic resetting, Class P, high power factor, sound rated A, unless otherwise specified. CEE NEMA Premium compliant.

ELECTRICAL
Standard class "P," thermally protected, autoresetting HPF ballast, sound rated A. CEE NEMA Premium compliant. All ballast leads extend a minimum of 6" through access location. NEC/CEC-compliant ballast disconnect is standard.

FINISH
All metal parts are processed with a five phase phosphate bonding treatment. Grid units are pre-painted with high glass baked white enamel, 86% reflective. Flanged units are painted after fabrication with a polyester powder coat, reflectance of 90%.

SHIELDING
100% prismatic acrylic, extruded and roll-embossed, diagonally oriented female prisms, unless otherwise specified.

FLANGED UNIT INSTALLATION
Fixtures are installed from below the ceiling and have overlapping trim flanges. Adjustable Uni-Lugs secure the fixture to the ceiling structure. Plaster frames are available if required.

CERTIFICATION
All luminaires are built to UL 1598 standards and bear appropriate UL and cUL or CSA labels. Wet location labeling is standard.

ORDERING INFORMATION

EXAMPLE WT24-332G-FAA12-EU-C488-GLR

WT 24 – – – – –

MODEL
- **WT** Wet Location Lensed Troffer

SIZE
- **24** 2' × 4'

NO. OF LAMPS
- **2** Two
- **3** Three
- **4** Four
- **6** Six

LAMP TYPE
- **28** 4', T5: 28 Watt
- **32** 4', T8: 32, 30, 28 or 25 Watt
- **54** 4', T5HO: 54 or 51 Watt

CEILING TYPE
- **G** Inverted T-bar
- **F** Overlap Flange

DOOR STYLE
- **FA** White Flush Aluminum
- **RA** White Regressed Aluminum

SHIELDING
- **A12** Pattern 12 Acrylic 0.100" Nominal (Standard)
- **A12.125** Pattern 12 Acrylic 0.125" Nominal
- **A19** Pattern 19 Acrylic 0.156" Male Prism
- **DR12** High Impact Acrylic Pattern 12, .140" (Std.)

For complete list of lenses and louvers, see options and accessories.

VOLTAGE
- **U** 120V-277V
- **347** 347V

BALLAST
- **E** Electronic T8, Instant Start
- **3E** 3-Lamp Electronic T8, Instant Start
- **4E** 4-Lamp Electronic T8, Instant Start
- **24E** (1) 2-Lamp and (1) 4-Lamp Electronic T8, Instant Start
- **EP** Electronic T5 or T8, Programmed Start
- **3EP** 3-Lamp Electronic T5HO or T8, Programmed Start
- **4EP** 4-Lamp Electronic T5HO (N/A 347V) or T8, Programmed Start
- **24EP** (1) 2-Lamp and (1) 4-Lamp Electronic T5HO (N/A 347V) or T8, Programmed Start

For a specific ballast vendor show as option.

OPTIONS
- **F0730** T8, 70CRI, 3000K Lamps, Furn/Inst.
- **F0735** T8, 70CRI, 3500K Lamps, Furn/Inst.
- **F0741** T8, 70CRI, 4100K Lamps, Furn/Inst.
- **SLL** Spring Loaded Latches
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- **C488** ⅜" Flex with 4 No. 18 Wires
- **C424** ½" Flex with 4 No. 14 Wires
- **NYC** NYC Compliant
- **NYCU** NYC Compliant, Union Label

For a complete set of options, see options and accessories section.

Columbia LIGHTING

WT24

2' × 4' Wet Location Lensed Troffer / 2, 3, 4, or 6-Lamp T5, T5HO, T8

PHOTOMETRIC DATA

Test **13747** Test Date **12/3/04**

LUMINAIRE DATA

Luminaire	**WT24-332G-FSA12-3E-PAF** **WT Lensed Troffer** **2' × 4' 3-Lamp with A12 Pattern Acrylic Prismed Lens**
Ballast	**B232I120RH-A**
Ballast Factor	**0.88**
Lamp	**F32T8**
Lumens per Lamp	**2900**
Total Input Watts	**87**
Mounting	**Recessed**
Shielding Angle	**0° = 90 90° = 90**
Spacing Criterion	**0° = 1.25 90° = 1.37**
Luminous Opening in Feet	**Length: 3.82** **Width: 1.82** **Height: 0.00**

ZONAL LUMEN SUMMARY

Zone	Lumens	% Lamp	% Fixt.
0-30	2086	24.0	29.5
0-40	3448	39.6	48.8
0-60	5916	68.0	83.8
0-90	7064	81.2	100.0
0-180	7064	81.2	100.0

ENERGY DATA

Total Luminaire Efficiency	**81.2%**
Luminaire Efficacy Rating (LER)	**FL - 71**
ANSI/IESNA RP-1-2004 Compliance	**Noncompliant**
Comparative Yearly Lighting Energy Cost per 1000 Lumens	**$3.38 based on 3000 hrs. and $0.08 per KWH**

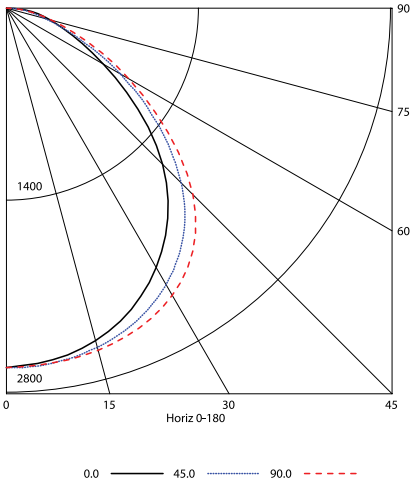
COEFFICIENTS OF UTILIZATION (%)

RC	80				70				50			0
RW	70	50	30	10	70	50	30	10	50	30	10	0
1	89	85	82	79	87	83	80	78	80	78	75	69
2	81	75	70	65	79	73	69	64	71	66	63	58
3	74	66	60	55	72	65	59	54	63	58	53	50
4	68	59	52	47	66	58	51	46	56	50	46	43
5	63	53	46	41	61	52	45	40	50	44	40	37
6	58	48	41	36	57	47	40	35	45	39	35	33
7	54	43	36	31	53	43	36	31	41	35	31	29
8	50	40	33	28	49	39	32	28	38	32	28	26
9	47	36	30	25	46	36	30	25	35	29	25	23
10	44	33	27	23	43	33	27	23	32	27	23	21

RCR

RCR = Room Cavity Ratio
RC = Effective Ceiling Cavity Reflectance **RW** = Wall Reflectance

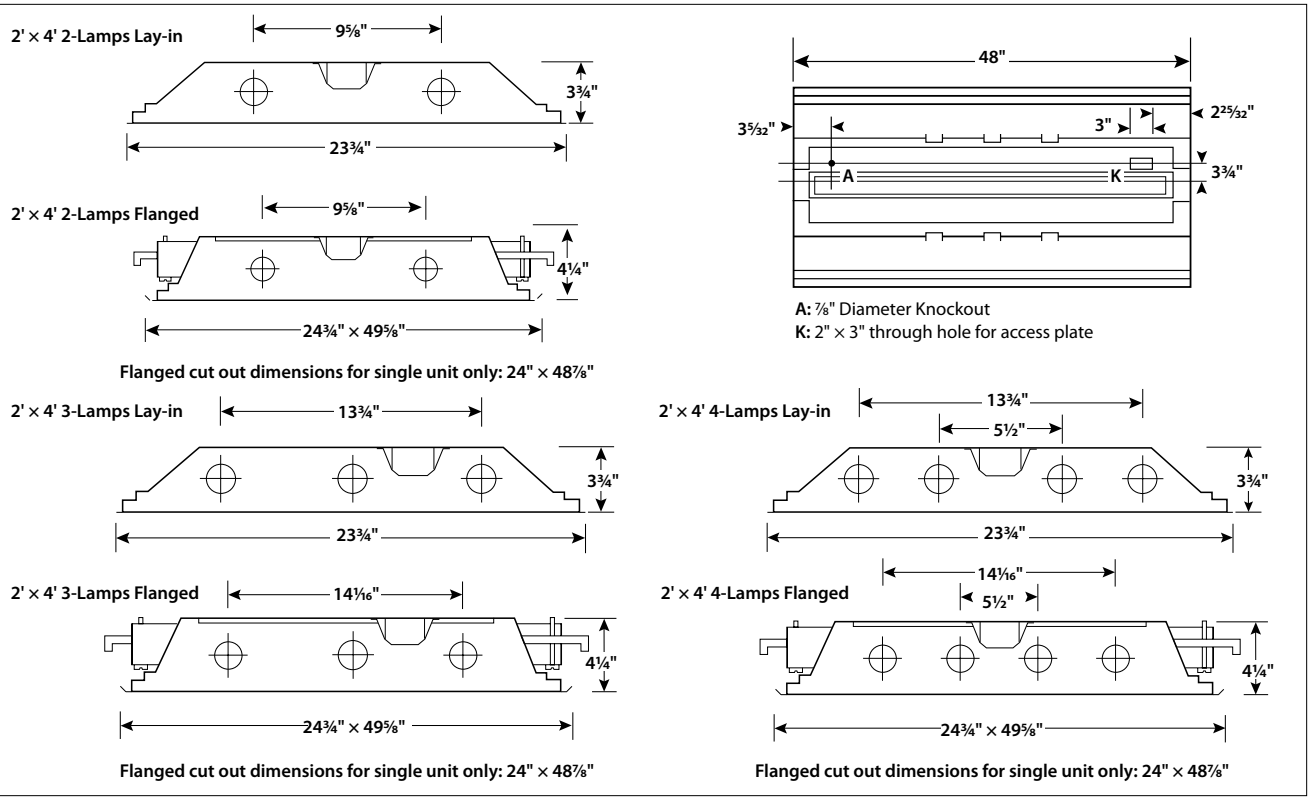
INDOOR CANDELA PLOT



AVG. LUMINANCE (Candela/Sq. M.)

Average Luminance Angle	0.0	22.5	45.0	67.5	90.0
0	4056	4056	4056	4056	4056
30	3903	3992	4160	4287	4321
40	3705	3846	4091	4271	4333
45	3525	3689	3946	4143	4208
50	3249	3430	3702	3890	3945
55	2888	3096	3374	3523	3579
60	2524	2731	2973	3100	3196
65	2235	2370	2517	2641	2795
70	2023	2073	2069	2200	2381
75	1956	1956	1741	1896	2070
80	2095	2015	1658	1783	1863
85	2327	2221	1830	1759	1794

DIMENSIONAL DATA



NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

DESIGNER WALL PACK – ROUND

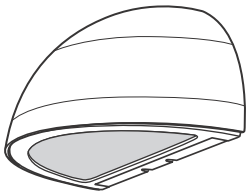
WPRD

CFL

SUBMITTAL:

JOB:

TYPE: B **VOLTAGE:**



EXAMPLE: **WPRD - 1 42T - GX24q-4 - WD - OPTIONS - UNV**

WPRD	1 42T	GX24q-4	WD	OPTIONS	UNV
SERIES	# OF LAMPS, WATTAGE	LAMP BASE	DISTRIBUTION	OPTIONS	VOLTAGE

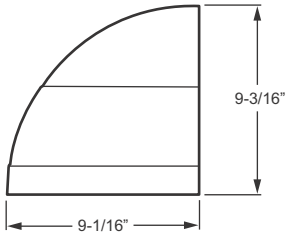
WET LOCATION

DARK SKY FRIENDLY

SERIES

FEATURES

- Overall dimensions: 18" x 9-3/16" x 9-1/16".
- Heat and impact-resistant tempered glass lens.
- Heavy-duty die-cast aluminum construction.
- Fully gasketed for wet locations.
- Provides full cutoff.
- Dark bronze finish only.



LAMP OPTIONS (Must specify)

COMPACT FLUORESCENT

# LAMPS	WATTAGE	LAMP BASE
1	26Q	G24q-3
1	32T	GX24q-3
1	42T	GX24q-4

DISTRIBUTION (Must specify)

WD	Wide Distribution
FD	Forward Throw Distribution

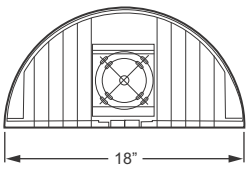
OPTIONS

SF	Single Fuse (120V or 277V only; must specify voltage)
DF	Double Fuse (208V or 240V only; must specify voltage)
GMF	HLR-GMF Style Slow Blow Fuse (Factory installed inside of unit. 120V and 277V only; must specify voltage)

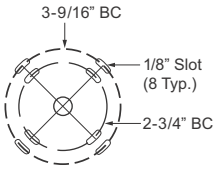
VOLTAGE (Must specify)

120	120V	**208**	208V
240	240V	**277**	277V
UNV	120-277V		

MOUNTING



BACK VIEW



BOLT CIRCLE PATTERN DETAIL

WPRD SERIES

HOUSING — Die-cast aluminum.
REFLECTIVE SURFACES — Aluminum reflector.
LENS — Tempered, flat, clear glass.

ELECTRICAL

4-pin socket, electronic ballast standard. Prewired at factory for easy field installation. Rated 0°F minimum starting temperature.

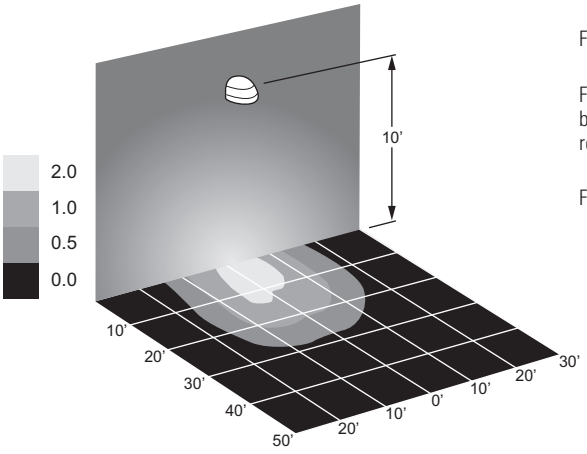
FINISH

Powder coated finish on heavy-duty die-cast housing. Dark bronze finish only.

MOUNTING

Wall mounts directly over a 4" maximum recessed outlet box.

FOOTCANDLE ESTIMATOR



FIXTURE: **WPRD-142T-GX24q-4-FD**

Footcandle calculations based on standard building reflectance of .10 with a ground reflectance of .0 and a light loss factor of .75.

Fixture installed at 15' mounting height.

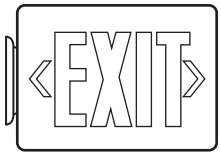
LABELS
cCSAus certified as luminaire suitable for wet location.

Williams OUTDOOR LIGHTING
H.E. Williams, Inc. ■ Carthage, Missouri ■ www.**hewilliams**.com ■ 417-358-4065 ■ Fax: 417-358-6015

LED EXIT SIGN

EXIT

SUBMITTAL:	
JOB:	
TYPE:	X
VOLTAGE:	



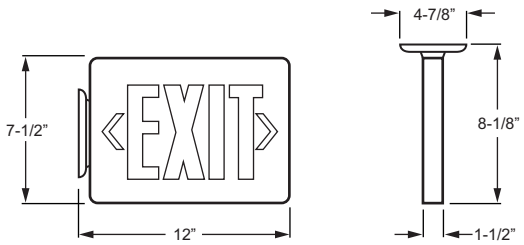
EXAMPLE: **EXIT - R - EM - WHT - OPTIONS**

EXIT	R	EM	WHT	OPTIONS
SERIES	LETTER COLOR	POWER OPTIONS	HOUSING COLOR	OPTIONS/ ACCESSORIES

SERIES

FEATURES

- Available as full-time AC powered unit or emergency unit with battery backup.
- LED lamp life of 25 years.
- Provided as universal single face/double face unit.
- Ni-Cad battery on emergency (EM) units provides 90 minutes of emergency operation.
- Automatic, low voltage disconnect (LVD) activates EM unit in event of partial power failure or brownout.
- Universal mounting canopy for top or side installation.
- Energy consumption of 3.2 watts for red letters and 3.8 watts for green letters.
- Charge rate/power on LED indicator light.
- Removable directional indicators.
- Available with industry-standard white or black housing.
- Custom messages available, consult factory for details.



LETTER COLOR (Must specify)

R	Red	**G**	Green

POWER OPTIONS (Must specify)

AC	AC operation	**EM**	AC operation with emergency battery backup

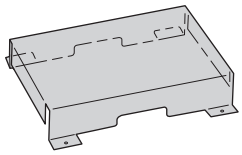
HOUSING COLOR (Must specify)

BLK	Black	**WHT**	Industry-standard white

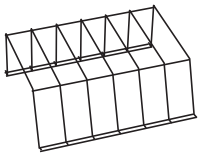
OPTIONS

COPY	Consult factory for custom message	**SALIDA**	Salida faceplate (industry-standard white only)
DC	Dual circuit	**SDT**	Self-diagnostic test

ACCESSORIES



PC1
Polycarbonate shield



WG
Wireguard

EXIT SERIES

HOUSING — Injection-molded, VO flame retardant, high-impact thermoplastic housing.
ELECTRICAL — Universal transformer for 120 or 277 VAC operation.
MOUNTING — Universal mounting canopy included for top or side installation.

LABELS

Listed to UL 924 standard as an exit light suitable for dry or damp location.

Williams DOWNLIGHTING
H.E. Williams, Inc. ■ Carthage, Missouri ■ www.**hewilliams**.com ■ 417-358-4065 ■ Fax: 417-358-6015